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MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt

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Operation and Maintenance Manual

D8R Series II Track-Type Tractor

AKA1-Up (Machine)
6YZ1-Up (Machine)

i01534239

Maintenance Interval Schedule

SMCS Code: 7000

Note: All safety information, warnings, and instructions must be read and understood before you perform any operation or any maintenance procedure.

Before each consecutive interval is performed, all of the maintenance requirements from the previous interval must also be performed.

When Required

Battery Electrolyte Level - Check 107
Battery, Battery Cable or Battery Disconnect Switch - Replace 107
Bearings - Adjust 108
Cutting Edges and End Bits - Inspect/Replace ... 119
Engine Air Filter Primary Element - Clean/Replace 120
Engine Air Filter Secondary Element - Replace .. 121
Engine Air Precleaner - Clean 122
Ether Starting Aid Cylinder - Replace 129
Fuel System - Prime 132
Fuses and Circuit Breakers - Replace/Reset 139
Oil Filter - Inspect 146
Radiator Core - Clean 147
Radiator Pressure Cap - Clean/Replace 148
Ripper Tip and Shank Protector - Inspect/ Replace 149
Winch Wire Rope - Install 164
Window Washer Reservoir - Fill 165
Windows - Clean 165

Every 10 Service Hours or Daily

Backup Alarm - Test 106
Braking System - Test 109
Cab Filter (Fresh Air) - Clean/Inspect/Replace ... 109
Cooling System Level - Check 116
Engine Oil Level - Check 123
Fuel System Primary Filter/Water Separator - Drain 135
Horn - Test 140
Hydraulic System Oil Level - Check 144
Indicators and Gauges - Test 145
Pivot Shaft Oil Level - Check 147
Seat Belt - Inspect 150
Transmission System Oil Level - Check 156
Walk-Around Inspection 161

Every 50 Service Hours or Weekly

Cab Filter (Recirculation) - Clean/Inspect/ Replace 110
Ripper Linkage and Cylinder Bearings - Lubricate 149
Track Pins - Inspect 152

Every 250 Service Hours or Monthly

Air Conditioner Belt - Inspect/Adjust/Replace 103
Alternator and Fan Belts - Inspect/Adjust/ Replace 105
Angle Blade Manual Tilt Brace - Lubricate 105
Coolant Sample (DEAC) - Obtain 110
Cooling System (DEAC) Additive - Add 111
Engine Oil Sample - Obtain 123
Engine Oil and Filter - Change 124
Equalizer Bar End Pins Oil Level - Check 128
Fan Drive Pulley and Idler - Lubricate 131
Final Drive Oil Level - Check 132
Fuel Tank Water and Sediment - Drain 138
Track - Check/Adjust 151
Winch Fairlead Rollers - Lubricate 163
Winch Oil Level - Check 163

Initial 500 Service Hours

Coolant Sample - Obtain 110
Winch Oil and Breather - Change/Clean 163

Every 500 Service Hours or 3 Months

Engine Crankcase Breather - Clean 122
Engine Oil and Filter - Change 124
Fuel System Primary Filter - Replace 134
Fuel System Secondary Filter - Replace 136
Fuel Tank Cap Filter and Strainer - Replace/Clean 137
Hydraulic System Oil Filters - Replace 142
Hydraulic System Oil Sample - Obtain 144
Recoil Spring Compartment Oil Level - Check ... 148
Transmission System Oil Filter - Replace 154
Transmission System Oil Sample - Obtain 156
Window Wipers - Inspect/Replace 165

Initial 1000 Service Hours

Electronic Unit Injector - Inspect/Adjust 119
Engine Valve Lash - Check/Adjust 127
Engine Valve Rotators - Inspect 128

Every 1000 Service Hours or 6 Months

Battery - Inspect 106
Fan (Variable) - Inspect 129
Fan Hub Oil (Variable) - Check 131
Lift Cylinder Yoke Bearings - Lubricate 146
Rollover Protective Structure (ROPS) and Falling Object Protective Structure (FOPS) - Inspect ... 150
Transmission Breather - Clean 154
Transmission System Oil and Screens - Change/Clean 158
Winch Oil and Breather - Change/Clean 163

Every 2000 Service Hours or 1 Year

Final Drive Oil - Change 131
Hydraulic System Oil - Change 140
Radiator Guard Pin Joint - Inspect 147
Track Roller Frame Guides - Inspect 153

Every Year

Air Conditioner In-Line Dryer - Replace 104
Coolant Sample - Obtain 110
Engine Air Filter Primary Element - Replace 121

Every 3000 Service Hours or 2 Years

Cooling System (DEAC) Coolant - Change 112
Cooling System (ELC) Extender - Add 115
Cooling System Water Temperature Regulator - Replace 118
Fan (Variable) Oil (Mineral) - Change 130

Every 3 Years

Seat Belt - Replace 150

Every 6000 Service Hours or 4 Years

Cooling System (ELC) Coolant - Change 114
Electronic Unit Injector - Inspect/Adjust 119
Engine Valve Lash - Check/Adjust 127
Engine Valve Rotators - Inspect 128
Fan (Variable) Oil (Synthetic) - Change 130

i01253897

Air Conditioner Belt - Inspect/Adjust/Replace (If Equipped)

SMCS Code: 1357-025; 1357-040; 1357-510

Inspect

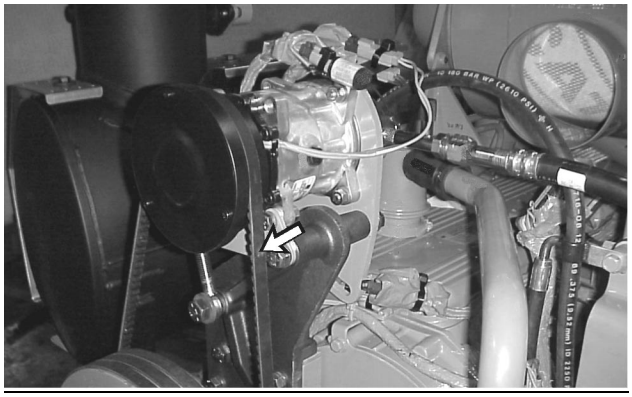

Illustration 189 g00671389

1. Inspect the condition of the compressor drive belt. The belt should deflect 14 to 20 mm (.56 to .81 inch) under 110 N (25 lb) of force. Use a **144-0235** Belt Tension Gauge in order to measure the tension.

Adjust/Replace

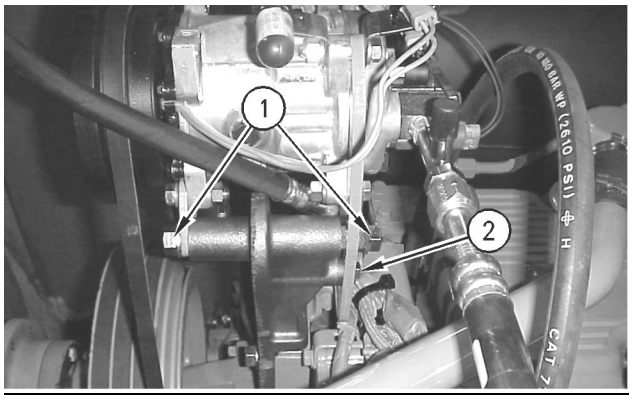

Illustration 190 g00671456

1. Loosen compressor mounting bolts (1) and (2).

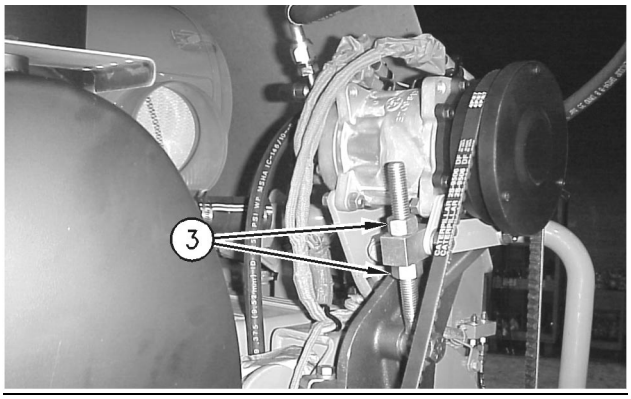

Illustration 191 g00671459

2. Loosen adjusting bracket nuts (3).

3. To achieve the correct belt tension, move the compressor inward or move the compressor outward. Tighten adjusting bracket nuts (3). Tighten compressor mounting bolts (1) and (2). Recheck the belt adjustment.

4. If necessary, repeat Step **1** to Step **3**.

Note: Use the same procedure in order to replace the belt.

i01247320

Air Conditioner In-Line Dryer - Replace (If Equipped)

SMCS Code: 7320-510; 7322-510

⚠ WARNING

Personal injury can result from contact with refrigerant.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use precaution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, release it slowly in a well ventilated area.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Use a certified recovery and recycling cart to properly remove the refrigerant from the air conditioning system.

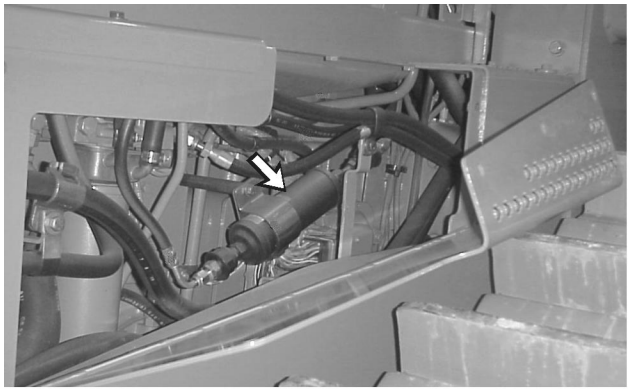

Illustration 192 g00665400

The in-line dryer is located behind the lower engine access door on the left side of the machine. The in-line dryer contains the orifice tube, a desiccant that dries the liquid refrigerant, and a tracer dye wafer.

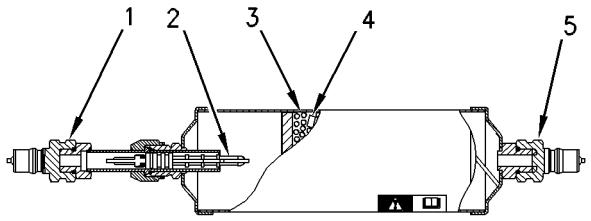

Illustration 193 g00676891

(1) Quick disconnect fitting for the “OUTLET” hose
(2) Orifice tube assembly
(3) Desiccant
(4) tracer dye wafer
(5) Quick disconnect fitting for the “INLET” hose

1. Stop the engine. Allow the air conditioning system to remain inactive for five minutes in order to equalize the pressure.
2. Disconnect the “INLET” hose from quick disconnect fitting (5) on the old dryer.
3. Connect the “INLET” hose to quick disconnect fitting (5) on the new dryer.
4. Start the engine and operate the air conditioning system for one minute in order to evacuate the refrigerant from the used dryer.
5. With the air conditioning system in operation, disconnect the “OUTLET” hose from quick disconnect fitting (1) on the old dryer.
6. Stop the engine. The air conditioning system must be idle for five minutes in order to equalize the pressure.
7. Connect the “OUTLET” hose that was disconnected in Step **5** to quick disconnect fitting (1) on the new dryer.

Also refer to the replacement procedure in the Service Manual Module, SENR-5664, “Air Conditioning and Heating”. Compliance with this procedure will provide the following benefits:

- The refrigerant compressor oil will not escape from the system.

- The amount of moisture that enters the system will be reduced.
- A sludge deposit will not form.
- It will not be necessary to top off the system with compressor oil or refrigerant.

Note: The R-134a refrigerant dryer should be replaced annually. Extremely humid operating conditions may require more frequent replacement of the dryer. The dryer should also be replaced if the air conditioning system has been leaking or if the system has been opened for service repair.

i01253920

Alternator and Fan Belts - Inspect/Adjust/Replace

SMCS Code: 1357-025; 1357-040; 1357-510

Inspect

1. Open the access door on the right side of the machine.

Note: Even if only one belt is worn or damaged, replace the belts in sets.

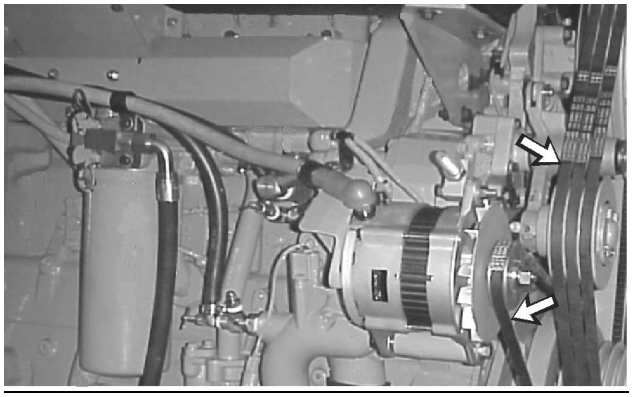

Illustration 194 g00671273

2. Inspect the condition of the fan and of the alternator belt. The belts should deflect 14 to 20 mm (.56 to .81 inch) under 110 N (25 lb) of force. Use a **144-0235** Belt Tension Gauge in order to measure the tension.

Adjust/Replace

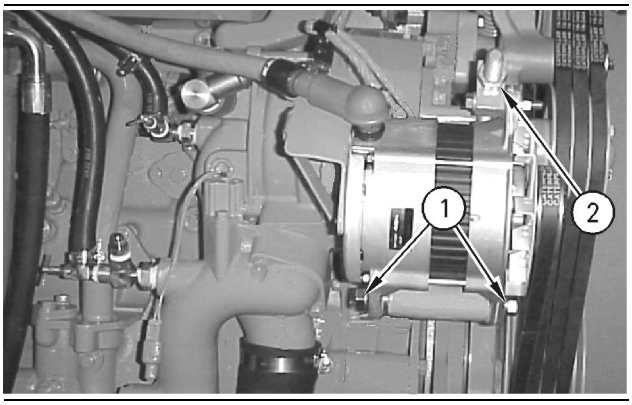

Illustration 195 g00671276

1. Loosen bolts (1).

2. Turn the adjusting nuts (2) until the correct belt tension is reached. To achieve the correct belt adjustment, move the alternator inward or move the alternator outward, as required.

3. Tighten bolts (1).

4. Close the access door.

Note: Use the same procedure in order to replace the belts.

Note: If new belts are installed, check the belt adjustment again after 30 minutes of engine operation.

i01034553

Angle Blade Manual Tilt Brace - Lubricate

SMCS Code: 6074-086

If equipped:

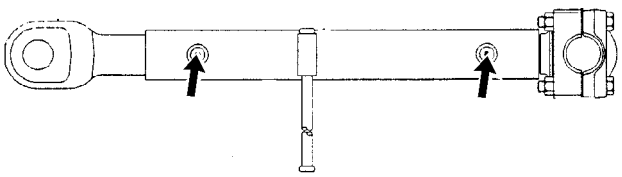

Illustration 196 g00103702

Lubricate the two fittings. Use Multipurpose Lithium Complex Grease with Molybdenum (MPGM).

i01250233

Backup Alarm - Test

SMCS Code: 7406-081

Illustration 197 g00660696

The backup alarm is on the rear of the machine.

In order to test the alarm for proper functioning, turn the engine start switch to the ON position.

Apply the service brake. Release the parking brake. Move the transmission gear selector to the REVERSE position.

The backup alarm should start to sound immediately. The backup alarm will continue to sound until the transmission gear selector is moved to the NEUTRAL position or to the FORWARD position.

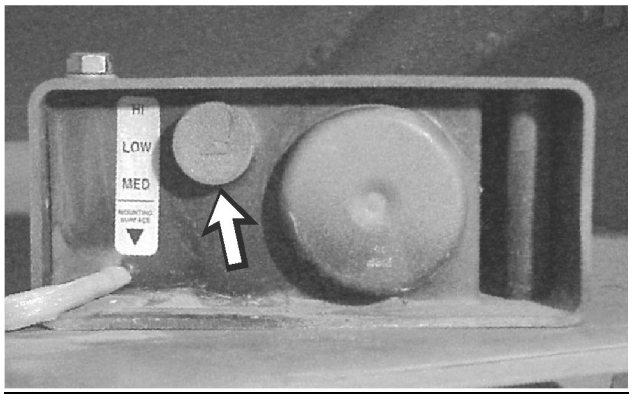

Illustration 198 g00637875

A three-position toggle switch for regulating the volume of the alarm is located on the rear of the alarm behind a red plastic cap. Remove the plastic cap for access to the switch. To adjust the volume level, move the three-position toggle switch to the desired position. The three positions on the switch are high, low, and medium. The three-position switch is set to the HIGH setting when the machine is shipped from the factory. The switch should remain at the HIGH setting unless the job site requires a lower volume level.

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Battery - Inspect

SMCS Code: 1401-040

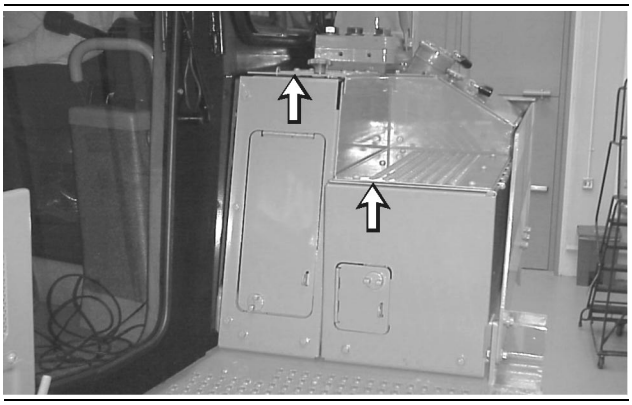


Illustration 199 g00679135

1. Open the battery access covers. The battery access covers are located on the left side of the machine outside the operator compartment.

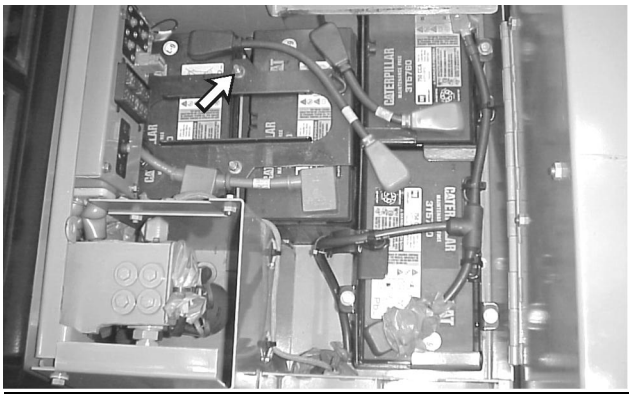


Illustration 200 g00679163

2. Tighten the battery retainers. Clean the top of the batteries with a clean cloth. Keep the terminals clean and coated with petroleum jelly. Install the terminal covers after you coat the terminals.

3. Close the battery access covers.

i01253260

Battery Electrolyte Level - Check

SMCS Code: 1401-535-FLV

Maintenance free batteries are installed at the factory.

Table 17

MAINTENANCE INTERVALS FOR BATTERIES	
Battery	**Interval**
Conventional	100 Hours
Low Maintenance	250 Hours
Maintenance Free	Maintenance Free

Each battery cell should not require more than 30 cc (1 oz) of water weekly. This usage of water is typical with the proper charging rate and with a moderate climate.

When you are operating the machine in extreme temperatures, check the water in the battery cells weekly.

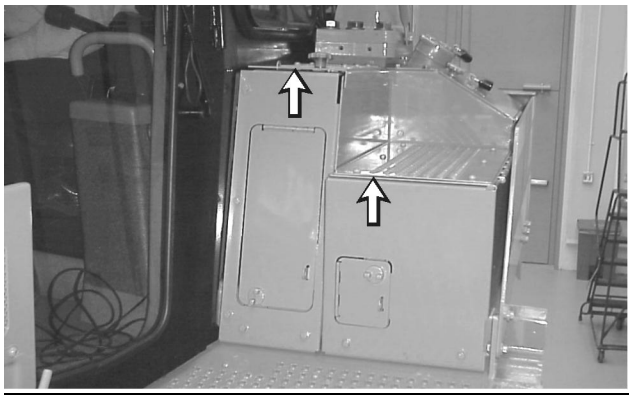


Illustration 201 g00679135

1. Open the battery access covers. The battery access covers are located on the left side of the machine outside the operator compartment.

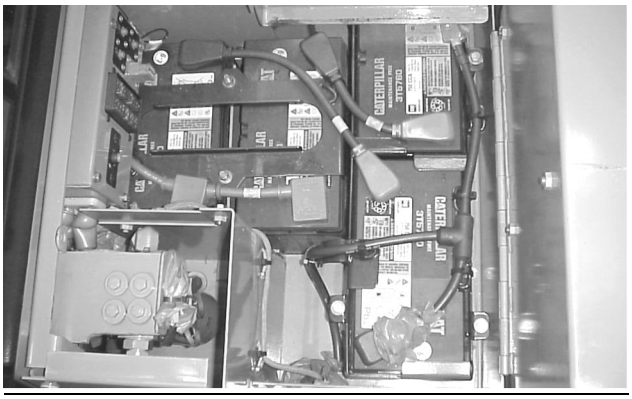


Illustration 202 g00679136

2. Inspect the electrolyte level in each battery cell. (A maintenance free battery does not require inspection.) Maintain the electrolyte level to the bottom of the filler openings. Use distilled water. If distilled water is not available, use clean drinking water.

3. Close the battery access covers.

i01024773

Battery, Battery Cable or Battery Disconnect Switch - Replace

SMCS Code: 1401-510; 1402-510; 1411-510

1. Turn the engine start switch key to the OFF position. Turn all of the switches to the OFF position.

2. Turn the battery disconnect switch to the OFF position. Remove the key.

3. Disconnect the battery cable at the battery disconnect switch. The battery disconnect switch is connected to the machine frame.

4. Disconnect the negative battery cable at the battery.

5. Replace the disconnect switch, the battery cables, or the batteries, as required.

6. Connect the negative battery cable at the battery.

7. Connect the negative battery cable at the battery disconnect switch.

8. Install the key and turn the battery disconnect switch to the ON position.

Battery Recycle

Always recycle a battery. Never discard a battery.

Always return used batteries to one of the following locations:

- A battery supplier
- An authorized battery collection facility
- Recycling facility

i01511791

Bearings - Adjust

SMCS Code: 6063-025

Trunnion Bearing

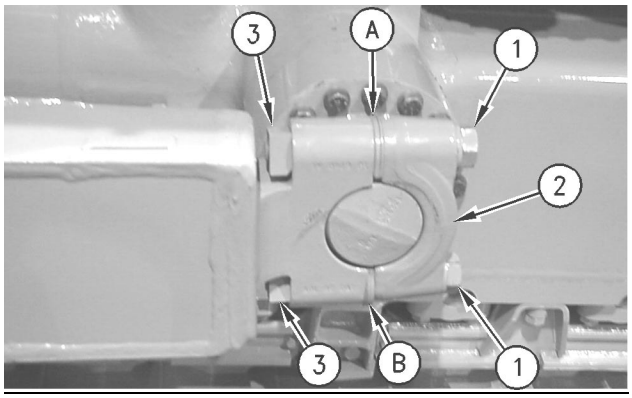


Illustration 203 g00784679

1. Lower the bulldozer blade to the ground. Walk to the left side of the machine.

2. Remove two nuts (3) from two bolts (1) on the trunnion bearing.

3. Remove two bolts (1), bearing cap (2), and two shim packs (A) and (B) as a unit.

4. Remove all of the shims from the push arm assembly.

5. Assemble the bearing cap without shims.

6. Tighten the bolts to a torque of 50 N·m (37 lb ft).

Maintain equal distance on both space (A) and space (B) of the bearing. Observe spaces (A) and (B) in order to determine the required number of shims.

7. Loosen the bolts. As needed, insert shims into spaces (A) and (B). When possible, use an equal number of shims for spaces (A) and (B).

Note: The number of shims at space (A) must be within one of the number of shims at space (B). For example, if space (A) has eight shims, space (B) must have seven, eight, or nine shims.

8. Add one additional shim to space (A). Add one additional shim to space (B).

9. Tighten the bolts to a torque of 1800 ± 200 N·m (1325 ± 150 lb ft).

10. The assembly should move freely on the trunnion. The The clearance between the bearing and the trunnion ball should be 0.6 ± 0.4 mm (0.024 ± 0.016).

Note: Removal of one or more shims after a short period of time may be necessary. Wear can be caused by normal variations of the surface or variations in the thickness of the paint.

Note: Normally, you should remove one shim from each shim pack (A) and (B) after the paint is worn off and the bearing is seated.

Repeat the procedure on the right side of the machine.

Lift Cylinder Bearing

Use the same procedure to adjust the lift cylinder bearings that is used to adjust the trunnion bearings.

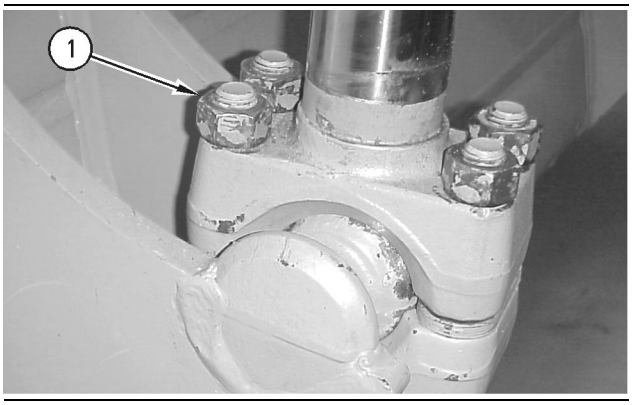


Illustration 204 g00784954

1. Tighten four nuts (1) to a torque of 900 ± 100 N·m (665 ± 75 lb ft).

i01249180

Braking System - Test

SMCS Code: 4100-081; 4267-081

⚠ WARNING

If the machine moves during the test, reduce the engine speed immediately, and engage the parking brake.

If the machine moved while testing the brakes, consult your Caterpillar dealer for brake inspection and repair. Damaged brakes must be repaired before returning the machine to operation.

Note: **The machine can drive through the brakes in first gear**.

Make sure that the area around the machine is clear of personnel and clear of obstacles.

Test the brakes on a dry, level surface.

Fasten the seat belt before you test the brakes.

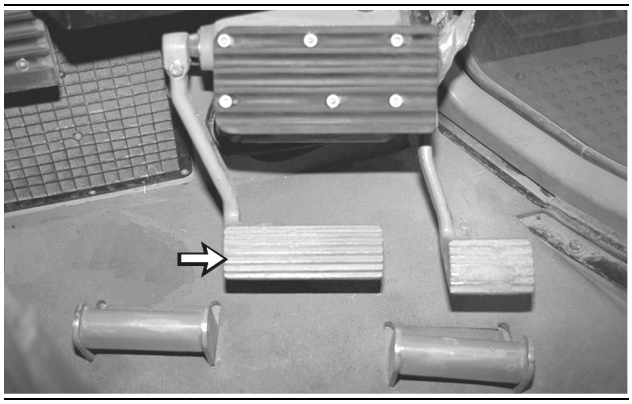


Illustration 205 g00661815

1. Start the engine.
2. Raise all attachments.
3. Depress the brake pedal.
4. Release the parking brake.
5. While the brake pedal is depressed, move the directional control to the SECOND SPEED FORWARD position.
6. Gradually increase the engine speed to full load speed. The machine should not move.
7. Move the directional control to the NEUTRAL position.
8. Reduce the engine speed to LOW IDLE. Engage the parking brake. Lower all attachments to the ground. Apply a slight down pressure. Stop the engine.

NOTICE
If the machine moved while testing the brakes, contact your Caterpillar dealer. Have the dealer inspect and, if necessary, repair the service brake before returning the machine to operation.

i01253194

Cab Filter (Fresh Air) - Clean/Inspect/Replace (If Equipped)

SMCS Code: 7342-040; 7342-070; 7342-510

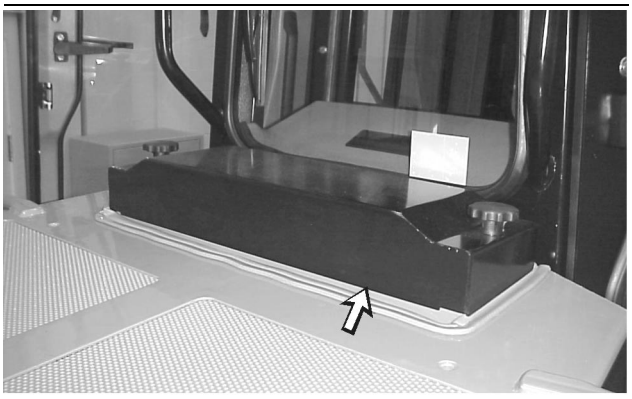


Illustration 206 g00679363

1. Remove the filter cover and the filter element. The filter cover is in front of the cab.
2. The filter element can be cleaned by using pressure air. Use a maximum air pressure of 205 kPa (30 psi). Direct the air from the clean side to the dirty side.
3. Look through the filter toward a bright light. Inspect the element for damage. Inspect the gaskets for damage. Replace damaged filters.
4. Install the filter element.

Note: Clean the filters more often in dusty conditions.

i01251123

Cab Filter (Recirculation) - Clean/Inspect/Replace (If Equipped)

SMCS Code: 7342-040; 7342-070; 7342-510

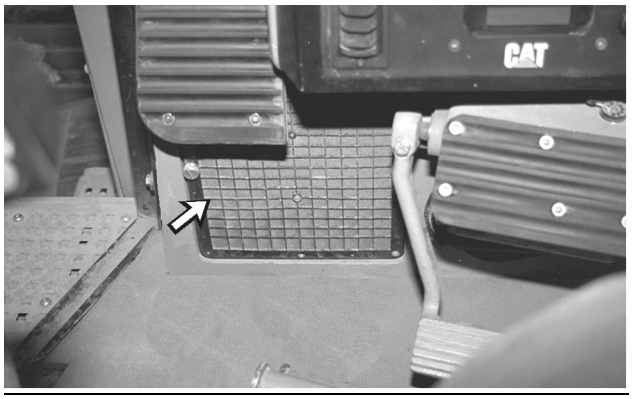


Illustration 207 g00666542

1. Remove the filter element that is positioned in the operator's compartment.
2. The filter element can be cleaned by using pressure air. Use a maximum air pressure of 205 kPa (30 psi). Direct the air from the clean side to the dirty side.
3. Look through the filter toward a bright light. Inspect the element for damage. Inspect the gaskets for damage. Replace damaged filters.
4. Install the filter element.

Note: Clean the filters more often in dusty conditions.

i01521730

Coolant Sample (DEAC) - Obtain

SMCS Code: 1395-554

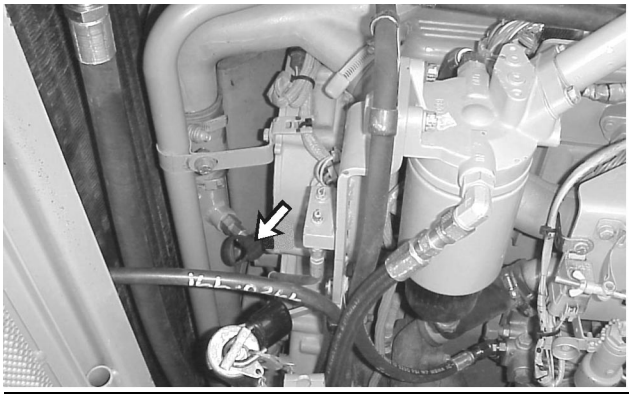


Illustration 208 g00760982

Coolant samples should be obtained from the coolant sample port. You should not obtain the samples from the drain valve or from the filler tube.

For additional information about sampling the coolant, see Operation and Maintenance Manual, SEBU6250, "Caterpillar Machine Fluids Recommendations" or consult your Caterpillar dealer.

Perform a Coolant Analysis (Level 1) at 250 hours for systems that contain diesel engine antifreeze/coolant (DEAC).

Level 1 results may indicate a need for Level 2 Analysis.

i01521751

Coolant Sample - Obtain

SMCS Code: 1395-554

Illustration 209 g00760982

Coolant samples should be obtained from the coolant sample port. You should not obtain the samples from the drain valve or from the filler tube.

For additional information about sampling the coolant, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

Perform a Coolant Analysis (Level 1) at 250 hours for systems that contain diesel engine antifreeze/coolant (DEAC).

Perform a Coolant Analysis (Level 2) at initial 500 hours for systems that contain diesel engine antifreeze/coolant (DEAC) or extended life coolant (ELC). Perform the analysis yearly after the initial 500 hours.

i01521789

Cooling System (DEAC) Additive - Add (If Equipped)

SMCS Code: 1352-510

Note: **DEAC only**

Note: In order to maintain a system with Extended Life Coolant (ELC), DO NOT use Supplemental Coolant Additive (SCA).

Table 18

Caterpillar SCA Requirements for Heavy-Duty Coolant/Antifreezes			
Cooling System Capacity in L (US gal)(1)	**Caterpillar Liquid SCA**		**Spin-on Element at 250 Service Hour Maintenance**
	Initial Fill(1)	**250 Service Hour Maintenance(2)**	
84 to 114 (22 to 30)	3.32 L (112 oz) or three units of 3P-2044 and one unit of 8T-1589	0.95 L (32 oz) or one unit of 3P-2044	9N-3718(3)

(1) Refill capacity for the D8R is 94 L (24.8320 US gal).
(1) Use a Caterpillar SCA when you do not use a Caterpillar Antifreeze.
(2) Do not exceed the 6 percent maximum concentration. Check with the supplemental coolant additive test kit.

NOTICE
Do not exceed the recommended six percent supplemental coolant additive concentration. Excessive supplemental coolant additive concentration can form deposits on the higher temperature surfaces of the cooling system, reducing the engine’s heat transfer characteristics. Reduced heat transfer could cause cracking of the cylinder head and other high temperature components. Excessive supplemental coolant additive concentration could also result in radiator tube blockage, overheating, and/or accelerated water pump seal wear. Never use both liquid supplemental coolant additive and the spin-on element (if equipped) at the same time. The use of those additives together could result in supplemental coolant additive concentration exceeding the recommended six percent maximum.

Liquid Supplemental Coolant Additive

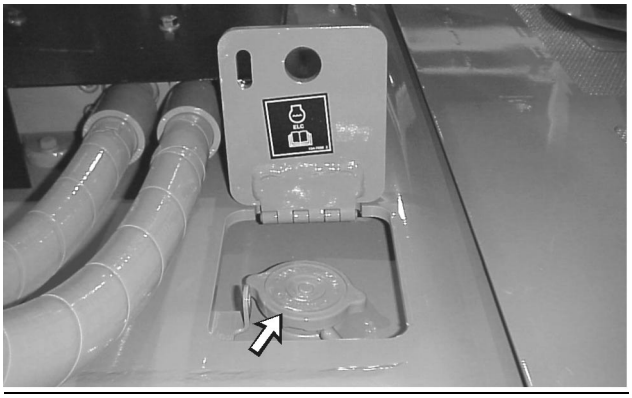


Illustration 210 g00581795

1. The filler cap is located inside the access door on the top, left side of the radiator guard. Slowly loosen the filler cap in order to relieve the pressure. Remove the cap.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

2. Add supplemental coolant additive. Drain some coolant from the radiator into a suitable container in order to allow space for the extra coolant additive.

Note: Always discard drained fluids according to local regulations.

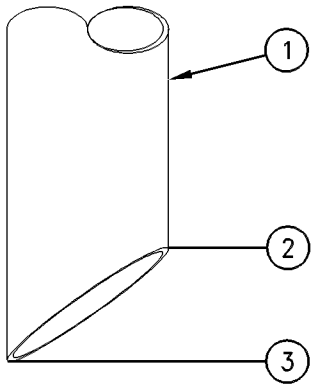


Illustration 211 g00475722

3. Add 0.24 L (.50 pint) of supplemental coolant additive for every 38 L (10 US gal) of engine cooling capacity.

4. Look into the filler tube (1). If necessary, add premixed coolant in order to correct the coolant level. Maintain the coolant level between area (2) and area (3) of the filler tube. Adding coolant above this area will cause the coolant to overflow the cooling system.

5. Inspect the filler cap gasket. Replace the filler cap gasket if the gasket is damaged.

6. Install the filler cap.

For additional information about additive for the cooling system, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01521817

Cooling System (DEAC) Coolant - Change (If Equipped)

SMCS Code: 1352-044; 1395-044

NOTICE
Make sure you read and understand the information in the topics Safety and Cooling System Specifications for all information pertaining to water, antifreeze and supplemental coolant additive requirements before you proceed with maintenance of the cooling system.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Drain the coolant whenever the coolant is dirty or whenever foaming is observed.

The filler cap is located inside the access door in the top, left side of the radiator guard.

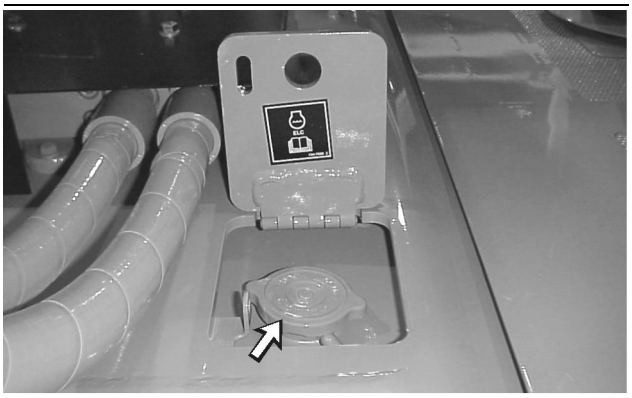


Illustration 212 g00581795

1. Slowly loosen the filler cap in order to relieve system pressure. Remove the filler cap.

Illustration 213 g00680867

2. Remove the access cover. The cover is located in the front, bottom guard.

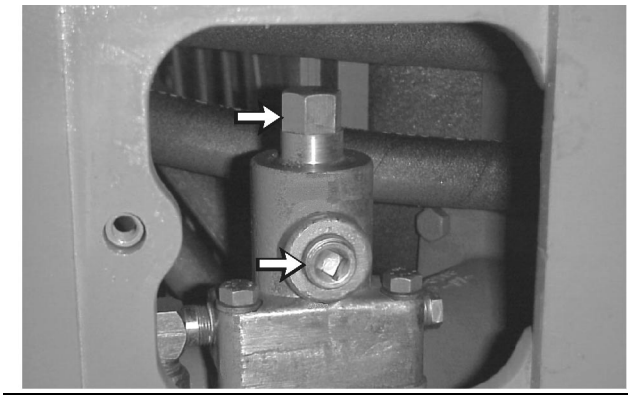


Illustration 214 g00680869

3. Remove the plug from the drain valve. Install a 12.7 millimeter (.5 inch) pipe into the drain valve. The pipe requires 1/2 - 14 NPTF threads.

4. Clamp a hose to the pipe in order to direct the coolant into a suitable container.

5. Open the drain valve. Allow the coolant to drain into a suitable container.

6. Close the drain valve. Fill the system with a solution which consists of clean water and of cooling system cleaner. The concentration of the cooling system cleaner should be 6 to 10 percent.

7. Start the engine. Run the engine for 90 minutes. Stop the engine. Drain the cleaning solution into a suitable container.

8. While the engine is stopped, flush the system with water. Flush the system until the draining water is clear.

9. Close the drain valve.

10. Replace the plug in the drain valve and install the access cover.

11. Add the coolant solution. See the following topics in this publication:

- Cooling System Specifications
- Refill Capacities

Note: Caterpillar antifreeze contains additive. If you are using Caterpillar antifreeze, do not add the supplemental coolant additive at this time. Also, do not change the supplemental coolant additive element at this time.

12. Start the engine. Run the engine without the filler cap until the thermostat opens and the coolant level stabilizes.

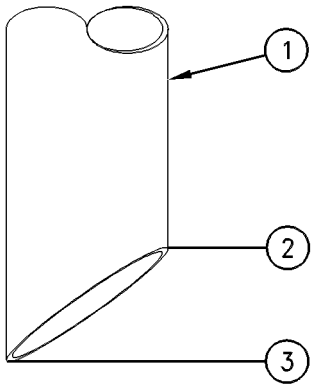


Illustration 215 g00475722

13. Look into filler tube (1). Maintain the coolant level between area (2) and area (3) of the filler tube. Adding coolant above this area of the filler tube will cause the coolant to overflow the cooling system.

14. If the gasket is damaged, replace the filler cap. Install the filler cap.

15. Stop the engine.

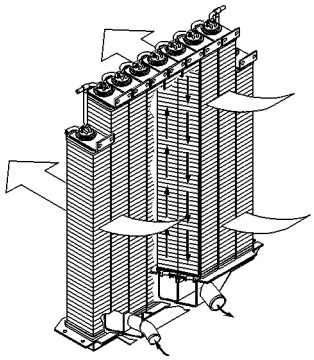


Illustration 216 g00533931

16. Clean the radiator cores with compressed air. You may need to use water in order to remove debris.

For additional information about the coolant, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01521832

Cooling System (ELC) Coolant - Change

SMCS Code: 1352-044

For information about adding an extender to your cooling system, see the Topic “Cooling System Extended Life Coolant Extender - Add” in this manual or consult your Caterpillar dealer.

NOTICE

Make sure you read and understand the information in the topics Safety and Cooling System Specifications for all information pertaining to water, antifreeze and supplemental coolant additive requirements before you proceed with maintenance of the cooling system.

To Drain the Cooling System

The filler cap is located inside the access door in the top, left side of the radiator guard.

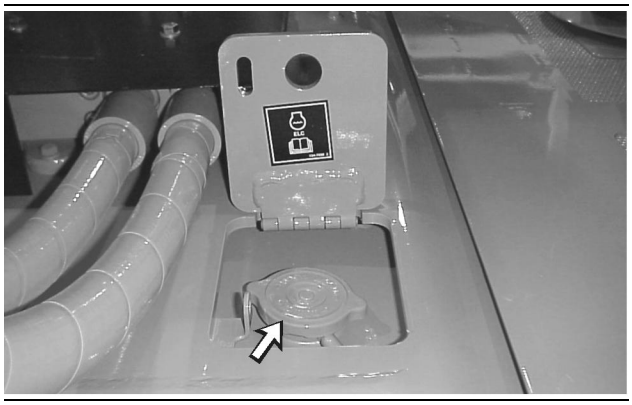


Illustration 217 g00581795

1. Slowly loosen the filler cap in order to relieve system pressure. Remove the filler cap.

Illustration 218 g00680867

2. Remove the access cover. The cover is located in the front, bottom guard.

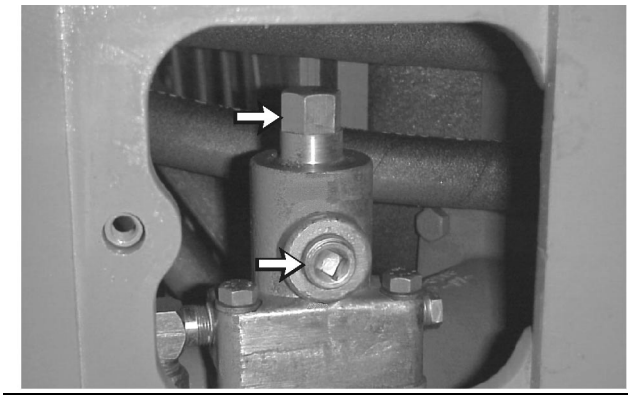


Illustration 219 g00680869

3. Remove the plug from the drain valve. Install a 12.7 millimeter (.5 inch) pipe into the drain valve. The pipe requires 1/2 - 14 NPTF threads. Clamp a hose to the pipe in order to direct the coolant into a suitable container.

4. Open the drain valve. Allow the coolant to drain into a suitable container.

5. Flush the system with water. Flush the system until the draining water is clear.

Note: If the cooling system is already using ELC, cleaning agents are not required to be used at the specified coolant change interval. Cleaning agents are only required if the system has been contaminated by the addition of some other type of coolant or by cooling system damage. Clean water is the only cleaning agent that is required when ELC is drained from the cooling system.

Note: If you change to an ELC from another type of coolant, use a Caterpillar cleaning agent to flush the cooling system. After you drain the cooling system, thoroughly flush the cooling system with clean water. **All of the cleaning agent must be removed from the cooling system.** Refer to the Topic “Extended Life Coolant (ELC)” in this manual.

6. Close the drain valve and install the plug.

7. Replace the access cover.

8. Add the ELC solution. See the following topics in this publication:

- Cooling System Specifications
- Refill Capacities

Note: Caterpillar antifreeze contains additive. If you are using Caterpillar antifreeze, do not add the supplemental coolant additive at this time. Also, do not change the supplemental coolant additive element at this time.

9. Start the engine. Run the engine without the filler cap until the thermostat opens and the coolant level stabilizes.

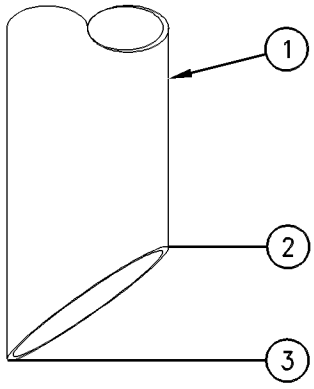


Illustration 220 g00475722

10. Look into filler tube (1). Maintain the coolant level between area (2) and area (3) of the filler tube. Adding coolant above this area of the filler tube will cause the coolant to overflow the cooling system.

11. If the gasket is damaged, replace the filler cap. Install the filler cap.

12. Stop the engine.

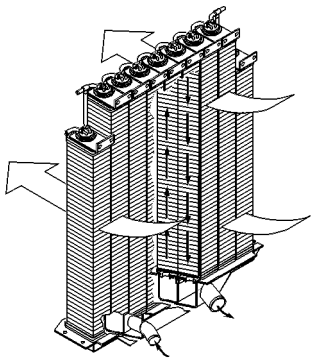


Illustration 221 g00533931

13. Clean the radiator cores with compressed air. You may need to use water in order to remove debris.

For additional information about the coolant, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01507314

Cooling System (ELC) Extender - Add

SMCS Code: 1350; 1352-544-NL; 1395-544-NL

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Table 19

Amount of Caterpillar ELC Extender by Cooling System Capacity	
Cooling System Capacity(1)	Recommended Amount of Caterpillar Extender
84 to 114 L (22 to 30 US gal)	2.15 L (72 oz)

(1) The cooling system capacity for the D8R is 94 L (24.8 US gal).

When a Caterpillar Extended Life Coolant (ELC) is used, an extender must be added to the cooling system. See the Operation and Maintenance Manual, “Maintenance Interval Schedule” for the proper service interval. The amount of extender is determined by the cooling system capacity.

For additional information about an extender, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

Extended Life Coolant (ELC) Additive

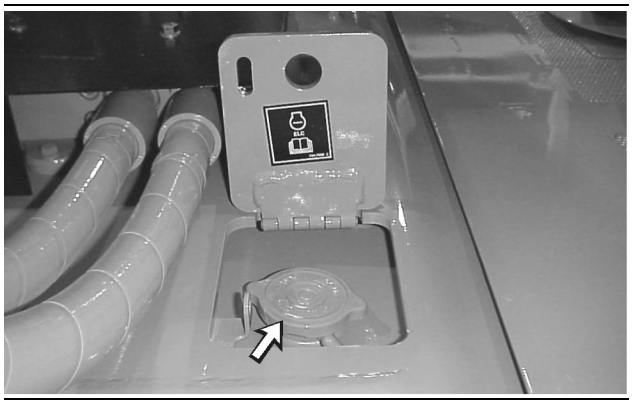


Illustration 222 g00581795

1. The filler cap is located inside the access door on the top, left side of the radiator guard. Slowly loosen the filler cap in order to relieve the pressure. Remove the cap.

2. Add ELC. Drain some coolant from the radiator into a suitable container in order to allow space for the extra ELC.

Note: Always discard drained fluids according to local regulations.

3. Start the engine. Run the engine without the filler cap until the thermostat opens and the coolant level stabilizes. Check for leaks.

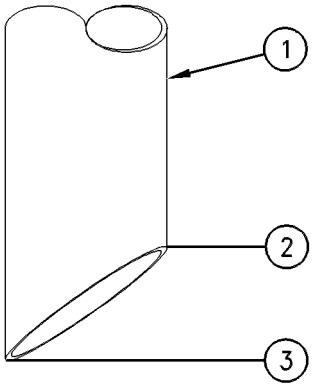


Illustration 223 g00475722

4. Look into filler tube (1). If necessary, add premixed coolant in order to correct the coolant level. Maintain the coolant level between area (2) and area (3) of the filler tube. Adding coolant above this area of the filler tube will cause the coolant to overflow the cooling system.

5. Inspect the filler cap gasket. Replace the filler cap if the gasket is damaged.

6. Install the filler cap.

i01253314

Cooling System Level - Check

SMCS Code: 1353-535-FLV; 1395-535-FLV

⚠ WARNING

At operating temperature, the engine coolant is hot and under pressure.

Steam can cause personal injury.

Check the coolant level only after the engine has been stopped and the fill cap is cool enough to touch with your bare hand.

Remove the fill cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with the skin and eyes to prevent personal injury.

This machine’s radiator has a surge tank. There is no top tank in this cooling system. The surge tank has a filler cap and a sight glass. It is not necessary to remove the filler cap in order to check the coolant level. The sight glass is inside the engine compartment that is on the front left side of the machine. The filler cap is beneath the access door that is on the top left side of the radiator guard.

Illustration 224 g00679538

1. Observe the sight glass in order to verify the level of the coolant. If the coolant completely covers the sight glass, the coolant level is okay. If the coolant level is visible in the sight glass, the coolant is low. Add coolant in order to fill the system.

Note: The factory fill is Extended Life Coolant (ELC). The system may be maintained as a Diesel Engine Antifreeze/Coolant (DEAC) without changing the coolant. It is acceptable to mix DEAC and ELC, but the advantage of ELC will be lost. Refer to Operation and Maintenance Manual, “Contamination of the ELC Cooling System”. Maintaining the system as ELC is preferred. See the sections “Coolant Recommendations” and “ELC Cooling System Maintenance”.

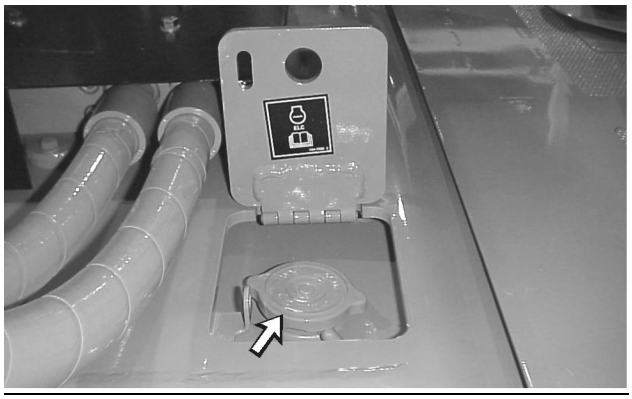


Illustration 225 g00581795

2. If it is necessary to add coolant, remove the filler cap slowly in order to relieve the pressure.

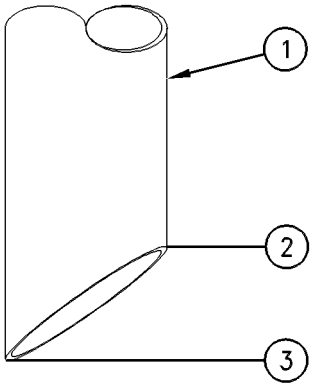


Illustration 226 g00475722

3. Look into filler tube (1). Maintain the coolant level between area (2) and area (3) of the filler tube. Adding coolant above this area of the filler tube will cause the coolant to overflow the cooling system. If you need to add coolant daily, check the cooling system for leaks.

4. Inspect the filler cap and the filler cap seal for debris, for foreign material, or for damage. Clean the filler cap with a clean cloth. Replace the radiator cap if the filler cap is damaged.

5. Install the filler cap.

6. Inspect the radiator core for debris. Clean the radiator core, if necessary.

Use compressed air, high pressure water, or steam to remove dust and debris from the radiator core. However, the use of compressed air is preferred.

i01253245

Cooling System Water Temperature Regulator - Replace

SMCS Code: 1355-510

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Replace the thermostat on a regular basis in order to reduce the chance of unscheduled downtime and of problems with the cooling system.

A new thermostat should be installed after the cooling system has been cleaned. Install the thermostat while the cooling system is completely drained or while the cooling system coolant is drained to a level that is below the thermostat housing.

NOTICE
Failure to replace the engine’s thermostat on a regularly scheduled basis could cause severe engine damage.

NOTICE
Replace the thermostat on a regular basis in order to reduce the chance of unscheduled downtime and of problems with the cooling system.

A new thermostat should be installed after the cooling system has been cleaned. Install the thermostat while the cooling system is completely drained or while the cooling system coolant is drained to a level that is below the thermostat housing.

Note: If you are only installing a new thermostat, drain the cooling system coolant to a level that is below the thermostat housing.

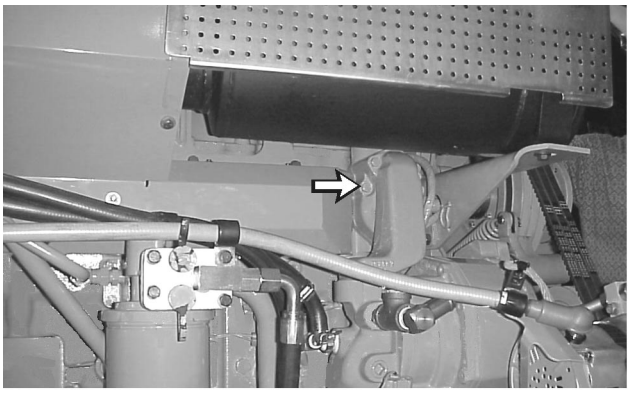


Illustration 227 g00667743

1. Loosen the hose clamp and remove the hose from the elbow. Disconnect the hose assembly from the thermostat housing assembly.
2. Remove the bolts from the elbow. Remove the elbow and the thermostat housing assembly.
3. Remove the gasket, the thermostat, and the seal from the thermostat housing.

NOTICE
Since Caterpillar engines incorporate a shunt design cooling system, it is mandatory to always operate the engine with a thermostat.

Depending on load, failure to operate with a thermostat could result in either an overheating or an overcooling condition.

NOTICE
If the thermostat is installed incorrectly, it will cause the engine to overheat.

4. Install a new seal in the thermostat housing. Install a new thermostat and a new gasket. Install the thermostat housing on the engine cylinder head.
5. Install the elbow and the hose. Tighten the hose clamp.
6. Replace the coolant that was drained from the system. See the Article “Refill Capacities” in this manual.

i01326416

Cutting Edges and End Bits - Inspect/Replace

SMCS Code: 6801-040; 6801-510; 6804-040; 6804-510

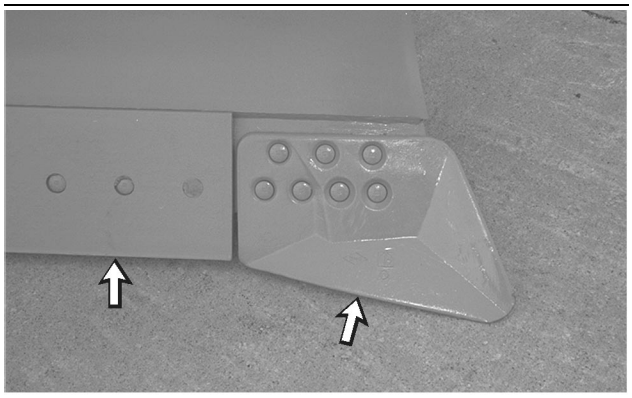


Illustration 228 g00039562

1. Raise the bulldozer blade and block up the bulldozer blade. When you remove the cutting edges and the end bits, maintain the bulldozer blade at a minimum height.

2. Remove the bolts. Then remove the cutting edge and the end bits.

3. Thoroughly clean all contact surfaces.

4. Inspect the opposite side of the cutting edge. If the opposite side of the cutting edge is not worn, turn the opposite side of the cutting edge outward and install the cutting edge.

5. If both sides of the cutting edge are worn, install a new cutting edge section.

Note: When the cutting edge is within 10 mm (0.4 inch) of the bottom of the support, change the cutting edge. **Do not allow wear to occur on the support.**

6. If the bottom edge or the outside edge of the end bit is worn, install a new end bit.

Note: When the end bit is within 10 mm (0.4 inch) of the bottom of the support, change the end bit. When the end bit is within 10 mm (0.4 inch) of the outside edge of the support, change the end bit. **Do not allow any wear to occur on the support.**

7. Install all bolts and tighten the bolts to a torque of 1150 ± 150 N·m (850 ± 110 lb ft). Refer to Operation and Maintenance Manual, “Torques for Ground Engaging Tools”.

8. Raise the bulldozer blade and remove the blocking. Lower the bulldozer blade to the ground.

9. After you operate the machine for a few hours, check all bolts for proper torque.

i01291242

Electronic Unit Injector - Inspect/Adjust

SMCS Code: 1290-025; 1290-040

⚠ WARNING

Be sure the engine cannot be started while this maintenance is being performed. To prevent possible injury, do not use the starting motor to turn the flywheel.

Hot engine components can cause burns. Allow additional time for the engine to cool before measuring/adjusting the unit injectors.

The electronic unit injectors use high voltage. Disconnect the unit injector enable circuit connector in order to prevent personal injury. Do not come in contact with the injector terminals while the engine is running.

⚠ WARNING

Electrical shock hazard. The electronic unit injector system uses 90-120 volts.

Adjust the electronic unit injector at the same interval as the valve lash adjustment. The operation of Caterpillar engines with improper adjustments of the electronic unit injector can reduce engine efficiency. This reduced efficiency could result in excessive fuel usage and/or shortened engine component life.

Refer to your machine’s Service Manual or your Caterpillar dealer for the complete valve adjustment procedure.

i01262460

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1054-070-PY; 1054-510-PY

NOTICE
Service the primary filter element only when the alert indicator for the intake air filter is flashing. Do not open the filter compartment unless it is time for service. Opening the filter compartment can cause dirt to get into the clean side of the filter housing.

NOTICE
Extremely short air filter life can result if the precleaner system malfunctions. If air filter life is drastically reduced from typical for the operating conditions, consult your Caterpillar Dealer. The exhaust system dust ejector for the strata tube precleaner must pull a minimum vacuum of 508 mm (20 inch) of water.

NOTICE
Service the engine air filters with the engine stopped. Engine damage could result.

NOTICE
Always leave the secondary filter element in place while you clean the primary element, or while you clean the air cleaner housing.

NOTICE
The filter should be kept in service for no longer than one year.

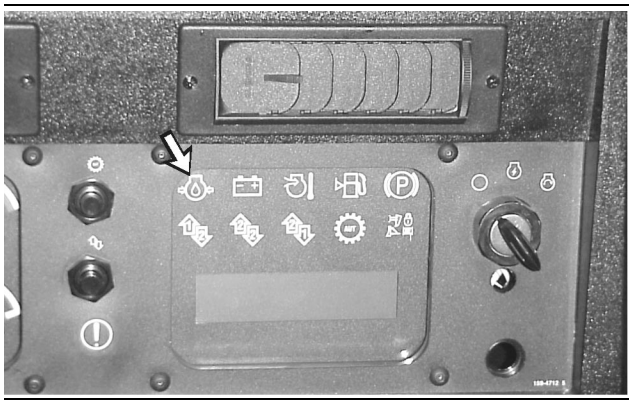


Illustration 229 g00671298

1. Open the engine compartment access door, if equipped.

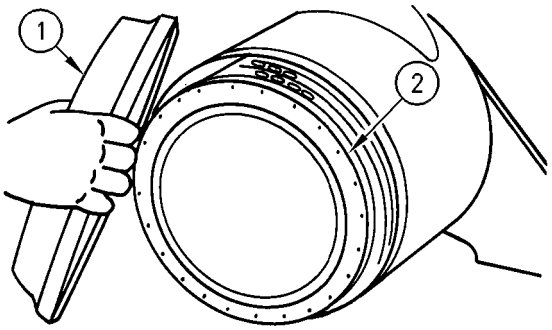


Illustration 230 g00470852

2. Remove the air cleaner cover (1). Pull out in order to remove the element.

3. Remove the primary filter element (2) from the air cleaner housing.

4. Mark the secondary filter element in order to show that the primary filter element has been serviced. The secondary filter element should be replaced when the primary filter element is serviced for the third time. Refer to Operation and Maintenance Manual, “Engine Air Filter Secondary element - Replace”.

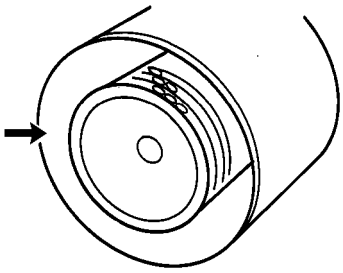


Illustration 231 g00470857

5. Clean the inside of the air cleaner housing. Keep the secondary filter element in place while you clean the housing.

6. If the primary filter element has not been cleaned six times, inspect the primary filter element. If the primary filter element has been cleaned six times, replace the primary filter element. Proceed to Step 9.

7. Inspect the primary filter element. Inspect the filter element for holes and for tears by looking through the filter element. Look toward a bright light. Inspect the element for damaged gaskets or for dented metal parts. Replace damaged filters. Always crush damaged filter elements. Properly discard the filter elements. If you replace the primary filter element, proceed to step 9.

8. If the primary filter element is not damaged and the element has not been previously cleaned six times, clean the element. The filter element can be cleaned by using pressure air. Use a maximum air pressure of 205 kPa (30 psi). Direct the air from the clean side to the dirty side. In order to show that the filter element has been cleaned, mark the element. The primary filter element can be cleaned up to six times.

NOTICE
Do not clean the filter elements by bumping or tapping them. Do not use filter elements with damaged pleats, gaskets, or seals. Do not wash the filter elements.

9. Push the filter element firmly in order to properly seat the element. Write the date on the element, if the primary element is replaced.

10. Install the air cleaner cover.

11. Close the access door, if equipped.

i01505166

Engine Air Filter Primary Element - Replace

SMCS Code: 1054-510-PY

NOTICE
Do not use the filter for longer than one year.

Refer to Operation and Maintenance Manual, “Engine Air Filter Primary Element-Clean/Replace” in this publication.

Write the date on the element, if the element is replaced.

i01454983

Engine Air Filter Secondary Element - Replace

SMCS Code: 1051-510-SE; 1054-510-SE

NOTICE
Always replace the secondary filter element. Never attempt to reuse it by cleaning.

The secondary filter element should be replaced at the time the primary element is serviced for the third time.

The secondary filter element should also be replaced if the yellow piston in the filter element indicator enters the red zone after installation of a clean primary element, or if the exhaust smoke is still black.

NOTICE
The filter should be kept in service for no longer than one year.

NOTICE
Always leave the secondary filter element in place while you clean the air cleaner housing.

1. Open the engine access door, if equipped.

2. Remove the air cleaner housing cover.

3. Remove the primary filter element. Refer to Operation and Maintenance Manual, “Engine Air Filter Primary Element - Clean/Replace”.

4. Clean the inside of the air cleaner housing.

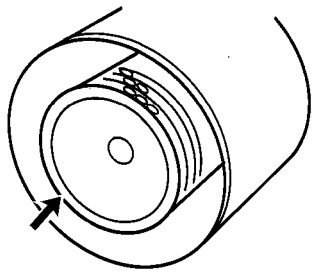


Illustration 232 g00470240

5. Remove the secondary filter element. Pull out in order to remove the element.

6. Install a new secondary filter element. Push the element firmly in order to properly seat the element. Write the date on the element, if the element is replaced.

7. Install the primary filter element and the air cleaner housing cover.

8. Close the engine access door, if equipped.

i01250559

Engine Air Precleaner - Clean

SMCS Code: 1050-070

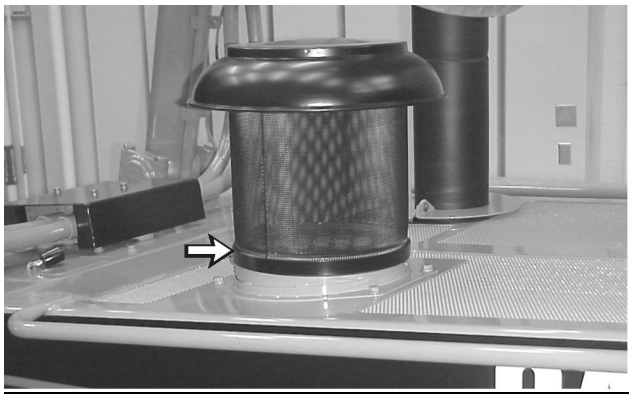


Illustration 233 g00666067

1. Inspect the precleaner screen for dirt accumulation.

2. Loosen the retainer and remove the screen.

3. Clean the screen with compressed air or water.

4. Replace the screen.

i01253373

Engine Crankcase Breather - Clean

SMCS Code: 1317-070

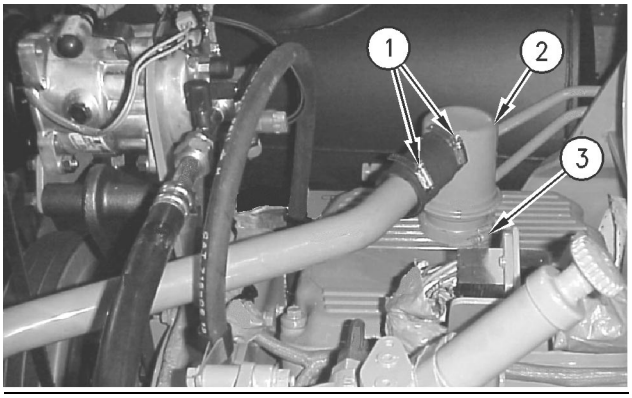


Illustration 234 g00671322

1. Loosen breather outlet hose clamps (1). Remove the hose from the breather assembly.

2. Remove clamp (3) from the base of the breather assembly.

3. Lift up on crankcase breather assembly (2), in order to remove the assembly.

4. Check the condition of the cover seal. Replace the cover seal if the cover seal is damaged.

5. Clean the breather in a clean nonflammable solvent.

6. Shake the breather until the breather is dry. You may also use pressure air to dry the breather.

7. Check the condition of the hose. Replace the hose if the hose is damaged.

8. Install breather assembly (2).

9. Install clamp (3).

10. Install the hose and breather outlet hose clamps (1).

i01251978

Engine Oil Level - Check

SMCS Code: 1302-535-FLV; 1326-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE
Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

1. Open the engine access door (if equipped) on the left side of the machine.

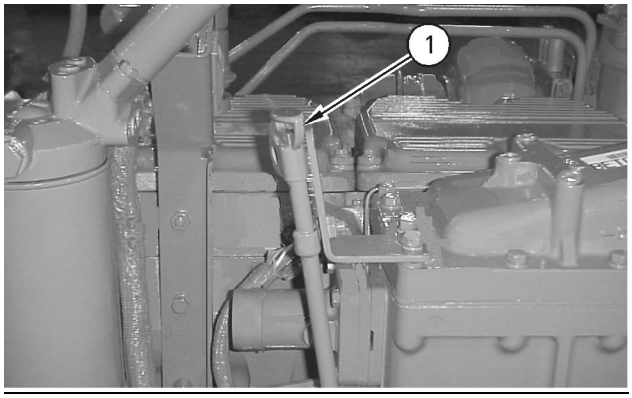


Illustration 235 g00667085

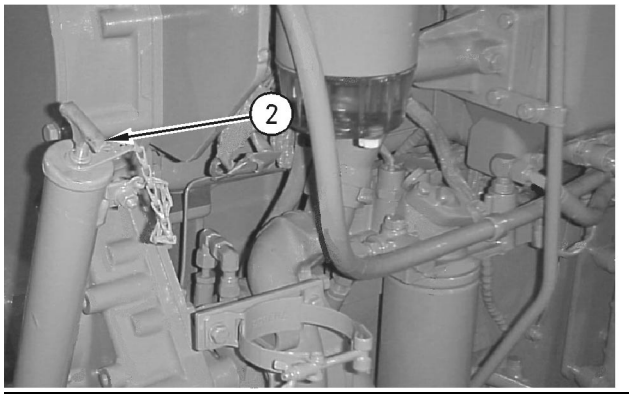


Illustration 236 g00667089

Illustration 237 g00489186

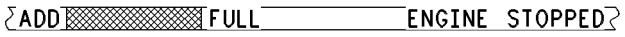


Illustration 238 g00489188

2. Check the “LOW IDLE” side of dipstick (1) while the engine is running. The oil should be at operating temperature. Maintain the oil level between the “ADD” mark and the “FULL” mark. This is the only accurate way to check the oil level.

Check the “ENGINE STOPPED” side of the dipstick while the engine is stopped. The oil should be cold. Maintain the oil level between the “LOW” mark and the “FULL” mark. This method should be used as reference only, before the engine is started.

Note: When you operate the machine on severe slopes, the oil level in the engine crankcase must be at the “FULL” mark on the “LOW IDLE” side of dipstick (1).

3. Remove oil filler cap (2) and add oil, if necessary.

4. Clean the oil filler cap and install the oil filler cap.

5. Close the engine access door (if equipped).

i01521903

Engine Oil Sample - Obtain

SMCS Code: 1000-008; 7542-008

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Obtain the sample of the engine oil as close as possible to the recommended sampling interval. The recommended sampling interval is every 250 service hours. In order to receive the full effect of S·O·S oil analysis, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent oil samplings that are evenly spaced.

1. Open the engine access door (if equipped) on the right side of the machine.

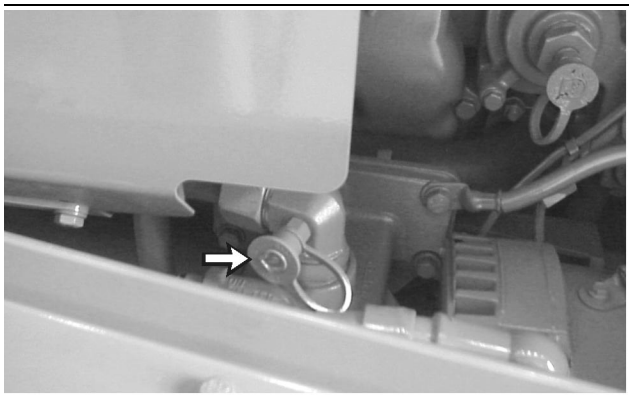


Illustration 239 g00667121

2. Remove the protective cap.

3. Use **169-8373** Fluid Sampling Bottle in order to obtain a sample of the engine oil.

4. Replace the protective cap.

5. Close the engine access door (if equipped).

For additional information about oil sampling, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01521934

Engine Oil and Filter - Change

SMCS Code: 1318-510

Selection of the Oil Change Interval

NOTICE
This machine is equipped with an engine that meets EPA Tier 2, Euro Stage II, or MOC Step 2 emission regulations. A 500 hour engine oil change interval is available, provided that operating conditions and recommended multigrade oil types are met. When these requirements are not met, shorten the oil change interval to 250 hours, or use an S·O·S oil sampling and analysis program to determine an acceptable oil change interval.

If you select an interval for oil and filter change that is too long, you may damage the engine.

Cat oil filters are recommended.

Recommended multigrade oil types are listed in Table 20. Do not use single grade oils.

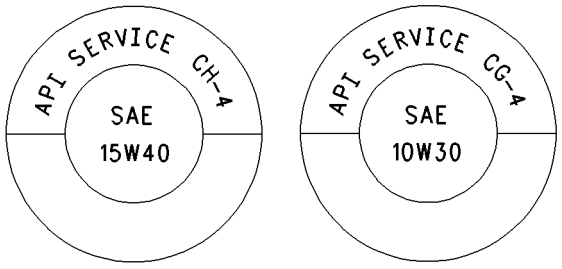


Illustration 240 g00753767

API Trademark

Commercial oils that are licensed by the American Petroleum Institute (API) bear this trademark. Commercial oils that do not bear this trademark are not licensed and these oils are not recommended. Oils that are not listed in Table 20 are not recommended.

Abnormally harsh operating cycles or harsh environments can shorten the service life of the engine oil. Arctic temperatures, corrosive environments, or extremely dusty conditions may require a reduction in engine oil change intervals from the recommendations in Table 20. Also refer to Manual, SEBU5898, “Cold Weather Recommendations”. Poor maintenance of air filters or of fuel filters requires reduced oil change intervals. See your Caterpillar dealer for more information if this product will experience abnormally harsh operating cycles or harsh environments.

Table 20

D8R Series II Engine Oil Change Interval[1]				
Multigrade Oil Type	Operating Conditions			
	Normal[2]	High Load Factor[3] above 51 L (13.5 US gal) per hr of fuel	Severe	
			Fuel Sulfur from 0.3% to 0.5% [4]	Altitude above 1830 m (6000 ft)
Cat DEO Preferred	500 hr	500 hr	500 hr	250 hr[6]
API CH-4 11.0 minimum TBN[4] Preferred	500 hr	500 hr	500 hr	250 hr[6]
API CH-4 TBN[4] below 11.0	500 hr	500 hr	250 hr[5]	250 hr[6]
API CG-4	500 hr	250 hr[5]	250 hr[5]	250 hr[6]
API CF-4	250 hr[5]	250 hr[6]	250 hr[6]	250 hr[6]

(1) The traditional oil change interval for engines is 250 hours. The standard oil change interval in this machine is 500 hours, if the operating conditions and recommended oil types that are listed in this table are met. Improvements in the engine allow this engine oil change interval. This new standard interval is not permitted for other machines. Refer to the applicable Operation and Maintenance Manuals for the other machines.

(2) Normal conditions include these factors: Fuel sulfur below 0.3%, altitude below 1830 m (6000 ft), and good air filter and fuel filter maintenance. Normal conditions do not include high load factor, harsh operating cycles, or harsh environments.

(3) High load factors can shorten the service life of your engine oil. Continuous heavy load cycles and very little idle time result in increased fuel consumption and oil contamination. These factors deplete the oil additives more rapidly. If the average fuel consumption of your D8R Series II exceeds 51 L (13.5 US gal) per hour, follow the “High Load Factor” recommendations in Table 20. To determine average fuel consumption, measure average fuel consumption for a period of 50 to 100 hours. If the application of the machine is changed, the average fuel consumption may change.

(4) For sulfur content above 0.5%, refer to Operation and Maintenance Manual, “Total Base Number (TBN) and Fuel Sulfur Levels for Direct Injection (DI) Diesel Engines” in the “Lubricant” section of this manual. Also, you may refer to this topic in Manual, SEBU6250.

(5) In order to verify an oil change interval of 500 hours, refer to “Program A” below.

(6) Use “Program B” below to determine an appropriate interval.

Adjustment of the Oil Change Interval

Note: Your Caterpillar dealer has additional information on these programs.

Program A

Verification for an Oil Change Interval of 500 Hours

This program consists of three oil change intervals of 500 hours. Oil sampling and analysis is done at 250 hours and 500 hours for each of the three intervals for a total of six oil samples. The analysis includes oil viscosity and infrared (IR) analysis of the oil. If all of the results are satisfactory, the 500 hour oil change interval is acceptable for the machine in that application. Repeat Program A if you change the application of the machine.

If a sample does not pass the oil analysis, take one of these actions:

- Shorten the oil change interval to 250 hours.
- Proceed to Program B.
- Change to a preferred oil type in Table 20.

Program B

Optimizing Oil Change Intervals

Begin with a 250 hour oil change interval. The oil change intervals are adjusted by increments. Each interval is adjusted an additional 50 hours. Periodic oil sampling and analysis is done during each interval. The analysis includes oil viscosity and infrared (IR) analysis of the oil. Repeat Program B if you change the application of the machine.

If an oil sample does not pass the analysis, shorten the oil change interval, or change to a preferred multigrade oil type in the listing above.

References

Reference: Form, PEDP7035, “Optimizing Oil Change Intervals”

Reference: Form, PEDP7036, “S·O·S Fluid Analysis”

Reference: Form, PEDP7076, “Understanding the S·O·S Oil Analysis Tests”

Procedure for Changing the Engine Oil and Filter

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

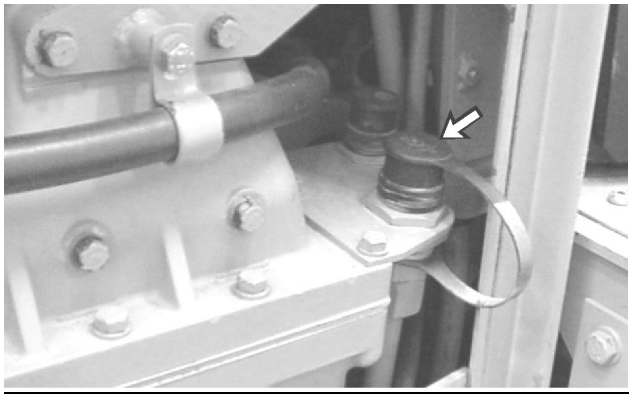


Illustration 241 g00670606

If the machine is equipped with a high speed oil change, use a **126-7539** Nozzle.

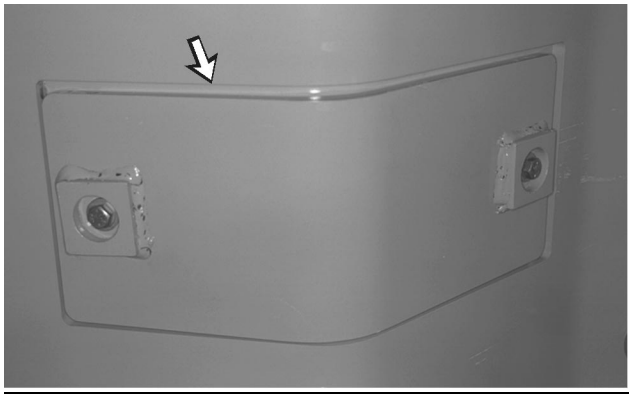


Illustration 242 g00490801

1. Remove two bolts in order to remove the crankcase drain access cover, which is in the crankcase guard.

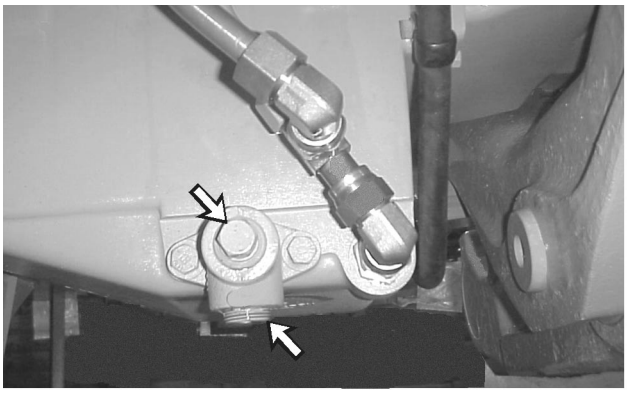


Illustration 243 g00670611

2. Remove the **4P-0520** Plug Adapter from the drain valve, if equipped.

3. Install a 25.4 mm (1.00 inch) pipe into the drain valve. The pipe requires a 1-11 1/2 NPTF pipe thread.

4. Open the drain valve. Allow the oil to drain into a suitable container. A drain hose may be attached to the pipe to aid in draining.

5. When the oil has completed draining from the crankcase, close the drain valve. Remove the pipe. Install the **4P-0520** Plug Adapter. Install the access cover.

6. Open the lower access cover on the right side of the engine.

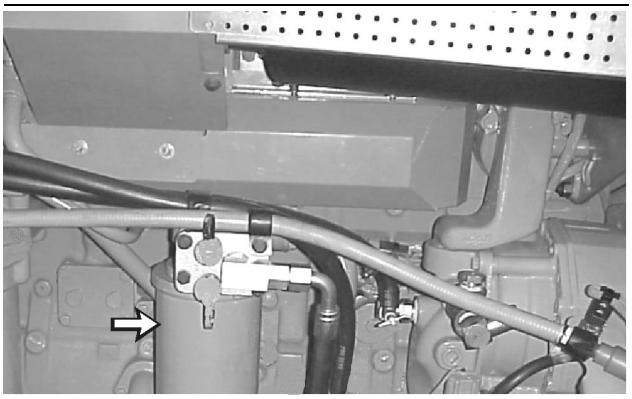


Illustration 244 g00670615

7. Remove the engine oil filter element and discard the engine oil filter element properly. Make sure that all of the old filter seal is removed from the filter base.

8. Apply a thin coat of oil to the seal on the new filter. Install the new engine oil filter element by hand. When the gasket contacts the filter base, tighten the filter element by an additional 3/4 turn (270 degrees). Rotation index marks are on the new filter element. These rotation index marks are spaced at 90 degree intervals. Use these rotation index marks as a guide for proper tightening.

Illustration 245 g00670621

9. Remove the oil filler cap. Fill the crankcase with new oil. See the topic Operation and Maintenance Manual, “Refill Capacities” in this manual. Clean the oil filler cap and install the oil filler cap.

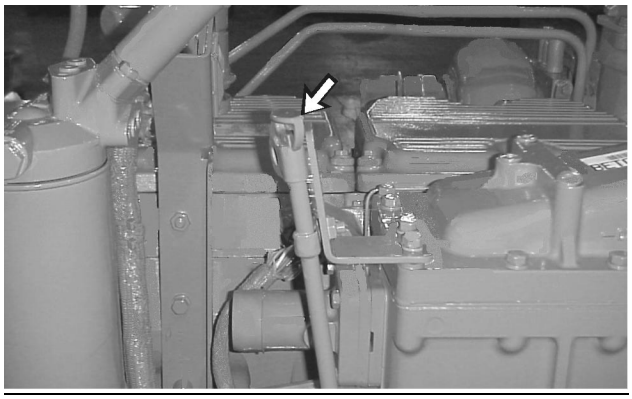


Illustration 246 g00670630

10. To ensure that the correct amount of oil was added, always measure the oil level with the dipstick.

Check the “ENGINE STOPPED” side of the dipstick while the engine is stopped. The oil should be cold. Maintain the oil level between the “LOW” mark and the “FULL” mark. This method should be used as reference only, before the engine is started.

11. Check the “LOW IDLE” side of the dipstick while the engine is running. The oil should be at operating temperature. Maintain the oil level between the “ADD” mark and the “FULL” mark. This is the only accurate way to check the oil level.

12. Secure the lower access cover on the right side of the engine.

For additional information about oil types, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01293610

Engine Valve Lash - Check/Adjust

SMCS Code: 1209-025

⚠ WARNING

To prevent possible injury, do not use the starter motor to turn the flywheel.

Hot engine components can cause burns. Allow additional time for the engine to cool before measuring valve clearance.

⚠ WARNING

Electrical shock hazard. The electronic unit injector system uses 90-120 volts.

NOTICE
Operation of Caterpillar engines with improper valve adjustments will reduce engine efficiency. This reduced efficiency could result in excessive fuel usage and/or shortened engine component life.

NOTICE
Measure the valve clearance with the engine stopped. To obtain an accurate measurement, allow at least 20 minutes for the valves to cool to engine cylinder head and engine block temperature.

Check the valve bridge before setting the valve lash. Ensure that the valve bridge is seated equally on both valve stems.

i01293990

Engine Valve Rotators - Inspect

SMCS Code: 1109-040

⚠ WARNING

When inspecting the valve rotators, protective glasses or face shield and protective clothing must be worn, to prevent being burned by hot oil or spray.

⚠ WARNING

Electrical shock hazard. The electronic unit injector system uses 90-120 volts.

NOTICE
Do not come in contact with the injector terminals while the engine is running.

1. Start the engine. Run the engine at low idle.

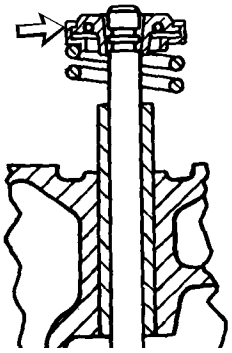


Illustration 247 g00038585

2. Watch the top surface of each valve rotator. Whenever an inlet valve closes or an exhaust valve closes, each valve rotator should turn.

3. If a valve rotator fails to rotate, consult your Caterpillar dealer for service.

Note: Caterpillar recommends replacing valve rotators that are operating improperly. An improperly operating valve rotator will shorten valve life because of accelerated wear on the valves.

Note: If a damaged valve rotator is not replaced, some valve face guttering could result. Metal particles from the valve could fall into the cylinder. This could cause damage to the piston head and to the cylinder head.

i01251387

Equalizer Bar End Pins Oil Level - Check

SMCS Code: 7206-535-FLV

NOTICE
Apply gear oil through the fittings with a hand operated lubrication pump or a suitable grease gun. Use of pressure operated lubricating equipment damages the seals.

NOTICE
Before and after the equalizer bar end pin is filled with gear oil, seal (1) must be flush with the equalizer bar. If the seals are not flush, damage to the seals can result by overfilling.

Illustration 248 g00586840

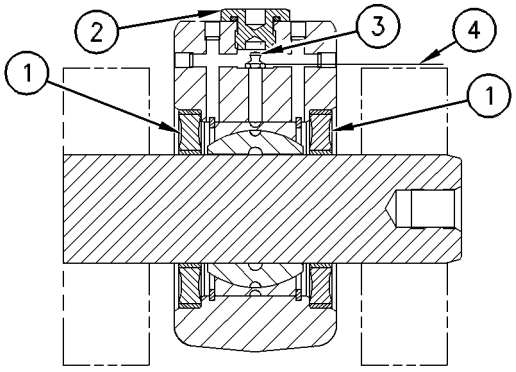


Illustration 249 g00586858

1. Clean the areas that are around the end pin with a high pressure wash. Inspect the condition of the seal (1).

2. Check the area for oil leakage. Be sure that the seal is in a neutral position.

3. Remove plug (2).

4. Check the oil level. Oil level (4) should be at the top of the hex head on the fitting.

5. If the oil level is low, apply the gear oil through fitting (3) until the gear oil reaches oil level (4) at the top of the hex head on the fitting. Remove any excess oil. This will maintain a volume of air. The gear oil must be applied with a 7H-1680 Lubrication Pump or a suitable grease gun. Use 75W-90 API GL-5, 80W-90 API GL-5, 85W-140 API GL-5, or 90 API GL-5 gear oil. The gear oil has excellent load carrying capacity.

6. Be sure that seals (1) are not pushed out. Push back the seals if the seals are pushed out.

7. Install plug (2).

Note: **MPGM GREASE IS ALLOWED ONLY FOR A FAILED SEAL. THE SEAL SHOULD BE REPLACED AS SOON AS POSSIBLE. THE COMBINATION OF GEAR OIL AND MPGM IS NOT HARMFUL TO THE MACHINE.**

When you operate the machine in arctic conditions, lubricate the equalizer bar with EMGARD EP 75W90 gear lubricant. EMGARD EP 75W90 gear lubricant is a synthetic lubricant. This lubricant is available from Hudson Corporation.

i01361950

Ether Starting Aid Cylinder - Replace (If Equipped)

SMCS Code: 1456-510-CD

Illustration 250 g00667157

1. Open the engine access door (if equipped) on the left side of the machine. The ether canister is mounted inside the compartment on the side of the engine.

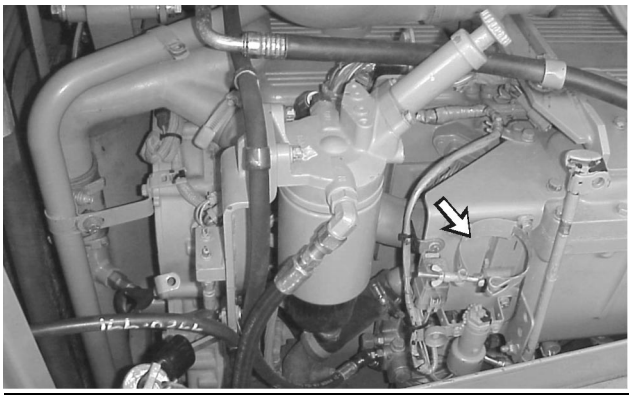


Illustration 251 g00758581

2. Loosen the retaining clamp. Remove the old canister by turning the canister counterclockwise.

3. Remove the old gasket. Install the new gasket.

4. Install the new canister. Turn the canister clockwise. Hand tighten the canister. Tighten the clamp around the canister.

5. Close the engine access door (if equipped).

i01271628

Fan (Variable) - Inspect

SMCS Code: 1356-040

NOTICE
Accumulated grease and oil on an attachment is a fire hazard.

Remove debris with steam cleaning or high pressure water at any time a significant quantity of oil is spilled on the attachment.

Note: Fan blades should be inspected more often when the tractor is used in a highly abrasive environment. If the fan blades are wearing out more quickly due to abrasive conditions, consult your Caterpillar dealer for abrasion resistant blades.

- Look for leaks. If you observe a leak, find the source of the leak and correct the leak. If you observe a leak, check the fluid levels more frequently.
- Inspect the fan blades for damage or for excessive wear. Replace the blades, if necessary.
- Make sure that the blades are secured to the fan hub. Tighten any loose bolts. Replace missing bolts.

i01296770

Fan (Variable) Oil (Mineral) - Change

SMCS Code: 1356-510-FLV

If equipped:

Variable fan hubs are factory filled with synthetic oil.

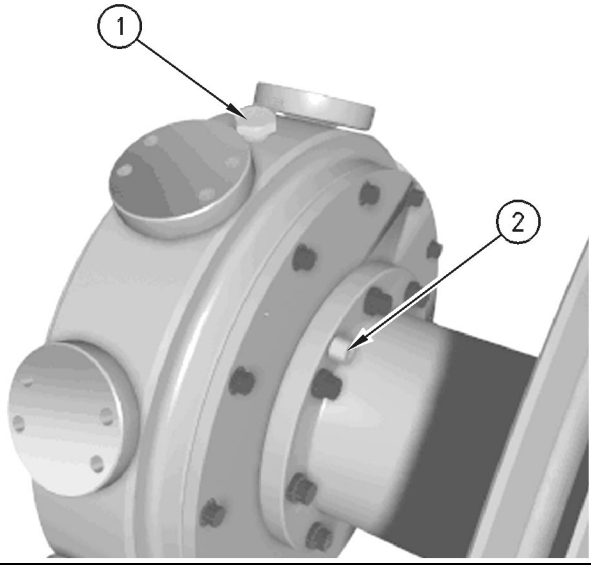


Illustration 252 g00563433

1. Rotate the hub until the filler plug (1) is in the TOP position.
2. Remove the drain plug from the bottom of the hub. The drain plug is opposite the filler plug. Remove filler plug (1).
3. Drain the oil into a suitable container.
4. Apply new thread sealant to the drain plug. Reinstall the drain plug.
5. Remove bleed plug (2).
6. Fill the hub with TO-4 transmission oil until the oil comes out of the bleed hole. The hub is filled to the proper level.
7. Apply new thread sealant and reinstall the filler and bleed plugs.
8. Check for oil leaks.

i01285593

Fan (Variable) Oil (Synthetic) - Change

SMCS Code: 1356-535-FLV

If equipped:

Variable fan hubs are factory filled with synthetic oil.

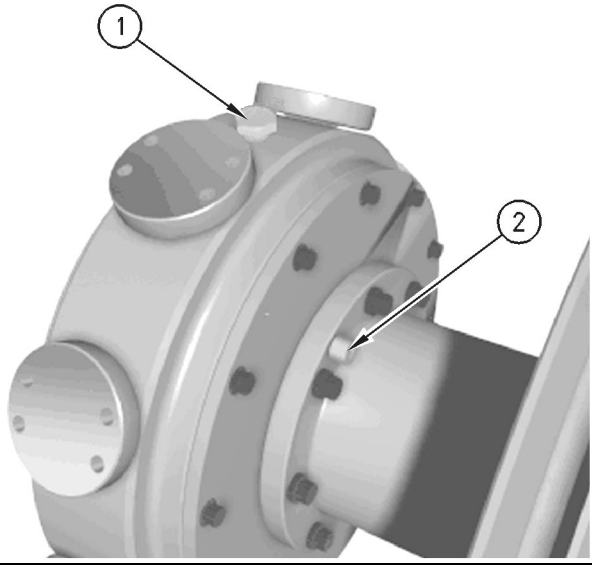


Illustration 253 g00563433

1. Rotate the hub until the filler plug (1) is in the TOP position.
2. Remove the drain plug from the bottom of the hub. The drain plug is opposite the filler plug. Remove filler plug (1).
3. Drain the oil into a suitable container.
4. Apply new thread sealant to the drain plug. Reinstall the drain plug.
5. Remove bleed plug (2).
6. Fill the hub with synthetic oil until the oil comes out of the bleed hole. The hub is filled to the proper level.
7. Apply new thread sealant and reinstall the filler and bleed plugs.
8. Check for oil leaks.

i01449080

Fan Drive Pulley and Idler - Lubricate

SMCS Code: 1359-086

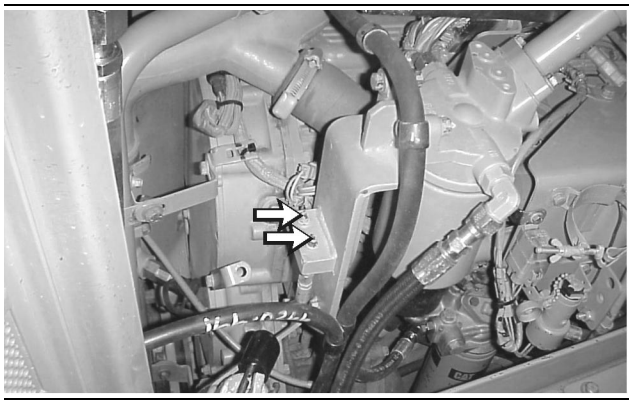


Illustration 254 g00758684

Lubricate two fittings with Bearing Lubricant Special Purpose Grease (SPG). The fittings are for the fan drive pulley and for the idler (belt tightener).

i01272480

Fan Hub Oil (Variable) - Check

SMCS Code: 1356-535-FLV

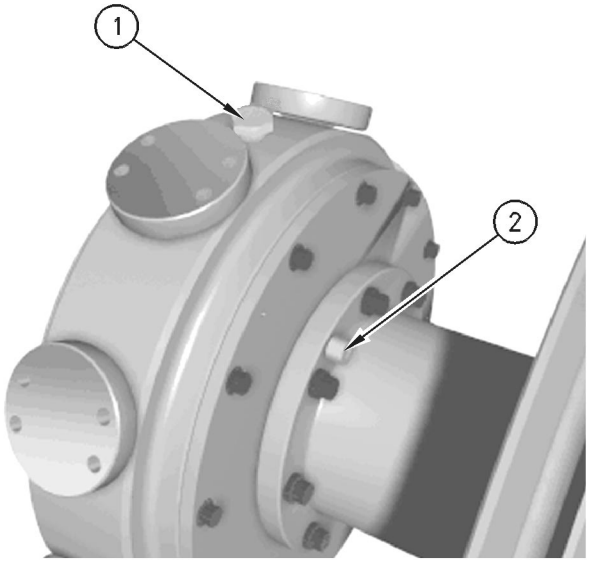


Illustration 255 g00563433

Perform the following procedure in order to add oil to the fan hub.

1. Rotate the hub until oil filler plug (1) is facing upward.
2. Remove oil filler plug (1) and oil level plug (2).
3. Add oil until oil begins to drip from the oil level hole.

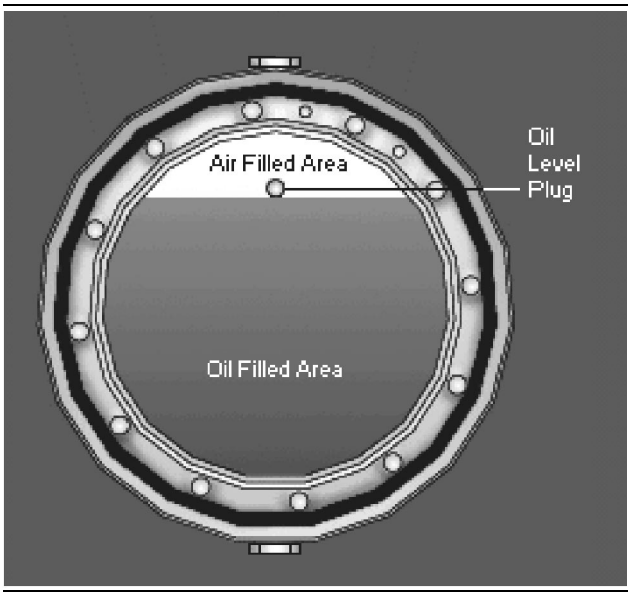


Illustration 256 g00607921

4. Allow the oil to settle in the hub. Recheck the oil level. Add additional oil, if necessary.

Note: Do not overfill the hub. An air space is required. The air space will allow the oil to expand. Failure to leave an air space may result in seal failure.

5. Apply 6V-5765 RTV Silicone Sealant to the threads of the oil level plug and the oil filler plug. Reinstall the plugs.
6. Check for any leaks and make any necessary repairs before operating the fan.

i01521967

Final Drive Oil - Change

SMCS Code: 4050-535-FLV

WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

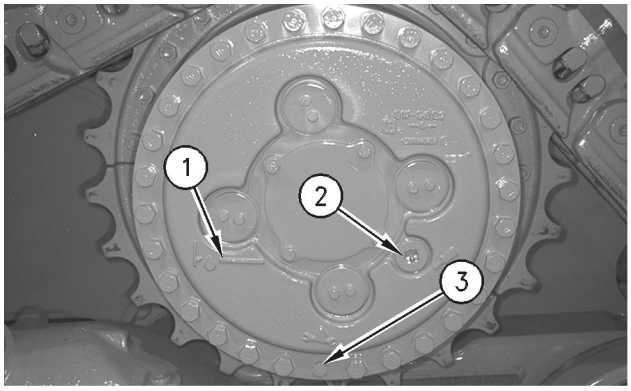


Illustration 257 g00482555

1. Position one final drive so that oil level mark (1) is horizontal. The drain plug (3) will point downward.

2. Remove oil filler plug (2).

3. Remove drain plug (3). Allow the oil to drain into a suitable container.

4. Inspect the drain plug seal. Replace the drain plug seal if the drain plug seal is damaged.

5. Clean the drain plug and install the drain plug.

6. Fill the final drive with oil to the bottom of the filler plug opening. See Operation and Maintenance Manual, “Refill Capacities”.

7. Inspect the condition of the seal of the filler plug. Replace the plug seal if the plug seal is damaged. Wipe the magnet in order to clean the plug. Install the plug.

8. Repeat Step 1 to Step 7 in order to change the oil in the other final drive.

For additional information about final drive oil, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i00940048

Final Drive Oil Level - Check

SMCS Code: 4050-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

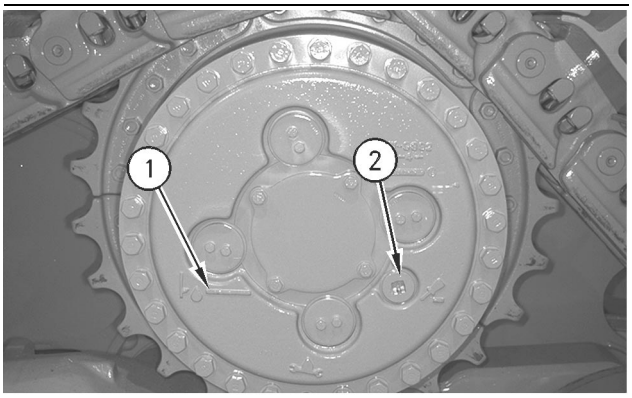


Illustration 258 g00479211

1. Position one final drive so that oil level mark (1) is horizontal with the oil filler plug (2).

2. Remove oil filler plug (2).

3. The oil level should be at the bottom of the filler plug opening. Add oil, if necessary.

4. Wipe the magnet in order to clean the plug.

5. Install oil filler plug (2).

6. Repeat Step 1 to Step 5 in order to check the oil level in the other final drive.

i01250575

Fuel System - Prime

SMCS Code: 1258

When you service the fuel filters or when you run out of fuel, you may trap air in the fuel system. The engine may not start when air is trapped in the fuel system. The following procedure will fill new filter elements with fuel.

The Secondary Fuel Filter Has Been Replaced

⚠ WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the start switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.

NOTICE
Use a suitable container to catch any fuel that might spill. Clean up any spilled fuel immediately.

NOTICE
Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over disconnected fuel system component.

Note: Refer to Operation and Maintenance Manual, “Fuel System Secondary Filter - Replace” for information on replacing the filter.

1. Turn the ignition switch to the “OFF” position. Open the engine access door, if equipped.

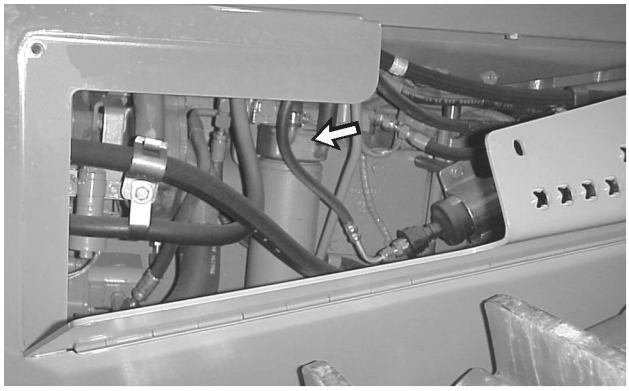


Illustration 259 g00666258
Secondary fuel filter base

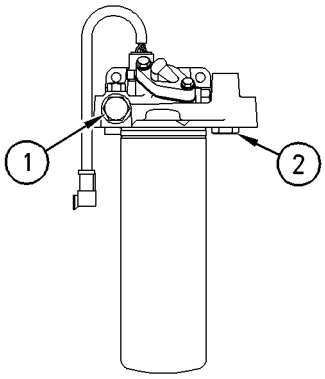


Illustration 260 g00666261
Secondary fuel filter base
(1) Air bleed screw
(2) Fuel pressure regulating valve

2. Open air bleed screw (1) for the fuel filter three full turns. Do not remove the air bleed screw.

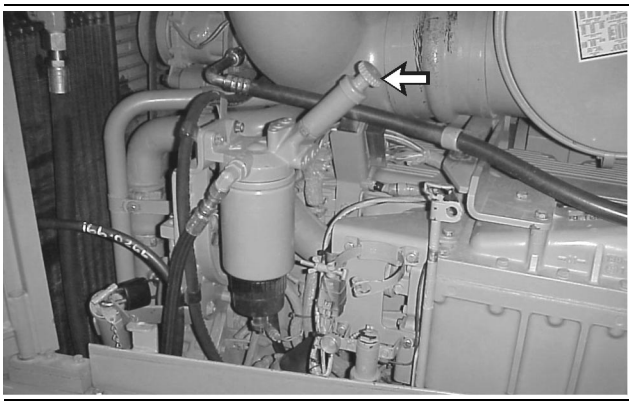


Illustration 261 g00666072

3. Turn the priming pump plunger counterclockwise in order to unlock the plunger. Observe screw (1) when you operate the plunger in order to purge air from the system. When a small drop of fuel appears at the threads of the screw, close and tighten the screw.

4. Push in the plunger and turn the plunger clockwise in order to lock the plunger.

NOTICE
Do not crank the engine continuously for more than 30 seconds. Allow the starting motor to cool for two minutes before cranking the engine again.

5. Start the engine. The engine should start and the engine should run smoothly.

Note: There may be a noticeable change in the sound of the running engine when the purging screw is tightened. The change in the sound of the engine is normal.

Note: Failure to tighten all fittings could result in serious fuel leaks.

6. Clean any residual fuel from the engine components.

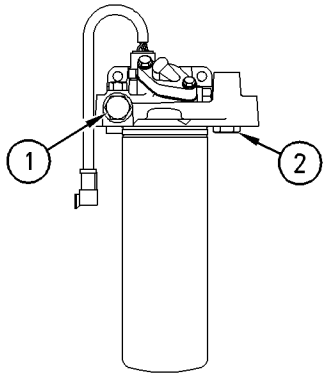
The Engine Has Been Run Out of Fuel

NOTICE
Use a suitable container to catch any fuel that might spill. Clean up any spilled fuel immediately.

NOTICE
Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over disconnected fuel system component.

1. Turn the ignition switch to the “OFF” position.

2. Fill the fuel tank with clean diesel fuel.



g00666261

Illustration 262

Secondary fuel filter base

(1) Screw for purging air
(2) Fuel pressure regulating valve

3. Open fuel pressure regulating valve (2) by two and a half turns. The regulating valve is located in the integral fuel filter base.

Note: Do not remove the regulating valve completely. Open the valve enough to allow the air that is trapped in the cylinder head to be purged from the fuel system.

NOTICE
Do not crank the engine continuously for more than 30 seconds. Allow the starting motor to cool for two minutes before cranking the engine again.

4. Crank the engine for 30 seconds. Use a suitable container to catch the fuel while you crank the engine. Allow the starter motor to cool for 2 minutes.

Note: You may use the hand priming pump for the fuel filter instead of cranking the engine.

5. Crank the engine for 30 seconds. Allow the starter motor to cool for 2 minutes.

6. Close and tighten fuel pressure regulating valve (2).

7. Crank the engine for 30 seconds. Allow the starter motor to cool for 2 minutes.

8. Repeat Step 7 until the engine starts and runs.

Note: Failure to tighten all fittings could result in serious fuel leaks.

9. Clean any residual fuel from the engine components.

i01276919

Fuel System Primary Filter - Replace

SMCS Code: 1260-510

⚠ WARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

NOTICE
Do not fill fuel filter with fuel before installing the fuel filter. Contaminated fuel causes accelerated wear to fuel system parts.

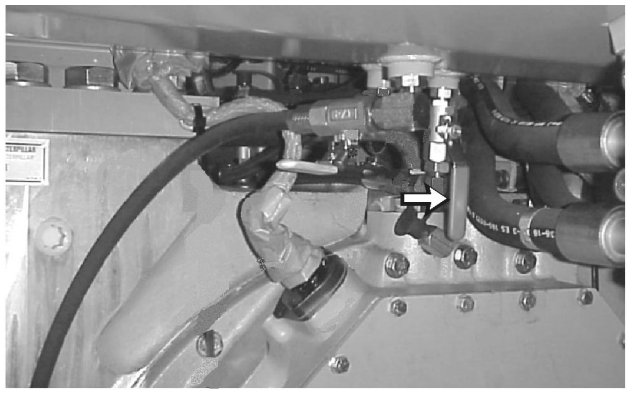


Illustration 263 g00678433

1. The fuel shutoff valve is at the rear of the machine under the fuel tank. Turn the red handle of the fuel shutoff valve clockwise in order to shut off the fuel supply.

2. Open the engine access door on the left side of the machine.

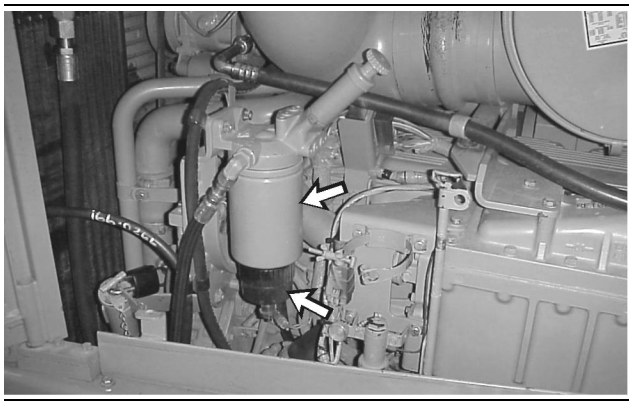


Illustration 264 g00758866

3. Drain the water separator bowl and remove the bowl from the bottom of the filter element. Clean the water separator bowl and inspect the seal. If the seal is worn or damaged, install a new seal.

4. Remove the filter element. Properly discard the filter element.

5. Clean the filter base. Be sure that all of the old seal is removed.

6. Install a 1R-0769 Filter Element. Coat the seal of the new filter element with clean diesel fuel.

   Install the new filter element by hand. When the seal contacts the base, tighten the filter element by an additional 3/4 turn.

7. Coat the seal of the water separator bowl with clean diesel fuel. Install the water separator bowl to the filter element.

8. Turn the red handle of the fuel shutoff valve counterclockwise in order to open the valve.

9. Prime the fuel system. See the Topic “Fuel System - Prime” in this manual.

10. Start the engine and run the engine. Check the filter and the water separator bowl for leaks.

11. Close the engine access door.

i01290990

Fuel System Primary Filter/Water Separator - Drain

SMCS Code: 1260-543; 1263-543

⚠ WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. To help prevent possible injury, turn the start switch off when changing fuel filters or water separator elements. Clean up fuel spills immediately.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

NOTICE
Do not allow dirt to enter the fuel system. Thoroughly clean the area around a fuel system component that will be disconnected. Fit a suitable cover over disconnected fuel system component.

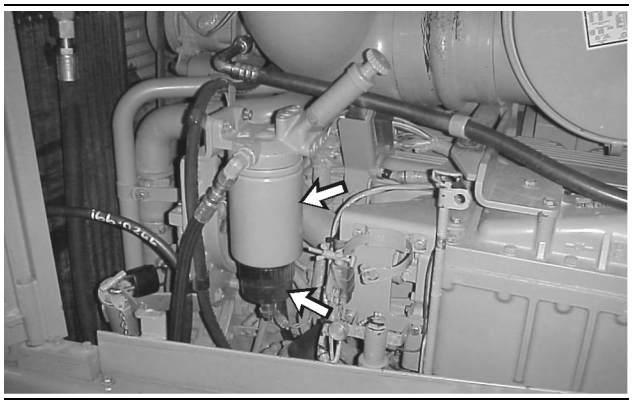


Illustration 265 g00758866

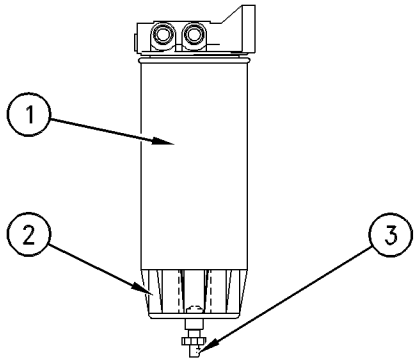


Illustration 266 g00104007

(1) Element
(2) Bowl
(3) Drain

Bowl (2) should be monitored daily for signs of water. If water is present, drain the water from the bowl.

1. Open drain (3). The drain is a self-ventilated drain. Catch the draining water in a suitable container. Dispose of the water properly.

2. Close drain (3).

NOTICE
The water separator is under suction during normal engine operation. Ensure that the drain valve is tightened securely to help prevent air from entering the fuel system.

i01253344

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510-SE

⚠ WARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

NOTICE
Do not fill fuel filters with fuel before installing them. Contaminated fuel will cause accelerated wear to fuel system parts.

Before you replace the secondary fuel filter element, replace the primary fuel filter element. See the Topic “Fuel System Primary Filter - Replace” in this manual.

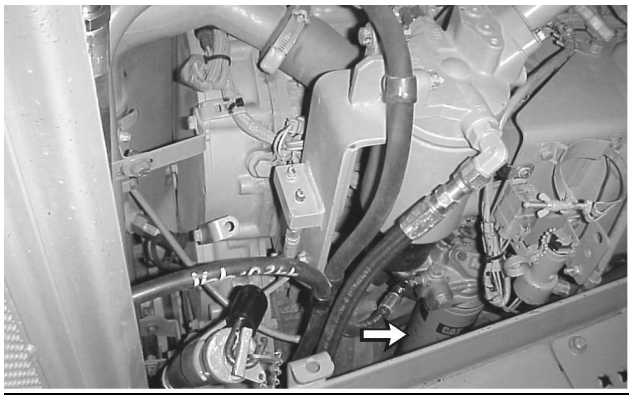


Illustration 267 g00667824

The secondary fuel filter is mounted on the left side of the engine.

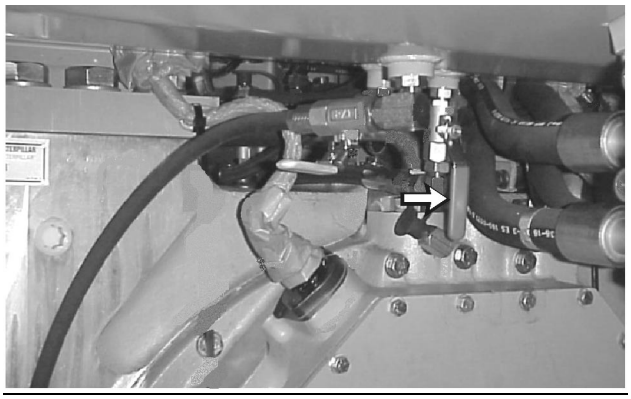


Illustration 268 g00678433

1. Turn the red handle of the fuel shutoff valve clockwise in order to shut off the fuel supply. The fuel shutoff valve is located at the rear of the machine under the fuel tank.
2. Open the engine access door on the left side of the machine.
3. Remove the fuel filter. Discard the fuel filter properly.
4. Clean the filter base. Make sure that all of the old seal is removed.
5. Install a 1R-0749 Fuel Filter. Coat the seal of the new filter with clean diesel fuel.
6. Install the new filter by hand. When the seal contacts the base, tighten the filter for an additional 3/4 turn.

   Rotation index marks are positioned on the filter at 90 degree intervals. Use these rotation index marks as a guide when you tighten the filter.
7. Open the fuel shutoff valve.
8. Prime the fuel system. See the Topic “Fuel System - Prime” in this manual.
9. Close the engine access door.

i01250635

Fuel Tank Cap Filter and Strainer - Replace/Clean

SMCS Code: 1273-070-STR; 1273-070-Z2

Illustration 269 g00666092

Illustration 270 g00666094

The fuel tank is located on the rear of the machine. The filler cap is on the left side of the machine next to the ROPS.

Only vented fuel caps have filters. Machines without the fast fill fuel adapter require a vented fuel cap.

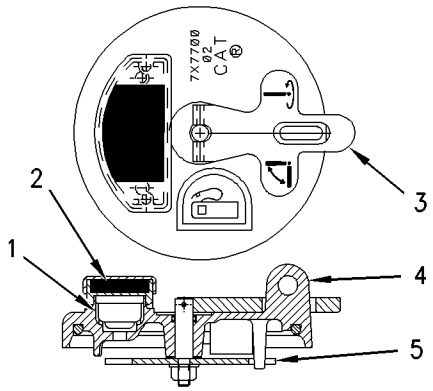


Illustration 271 g00668902

1. Lift lever (3) in order to remove the fuel tank filler cap. Turn the lever counterclockwise until the lever stops. Lift the cap straight up in order to remove the cap.

2. Remove the fuel strainer from the filler neck.

3. In order to replace the filter assembly, remove two screws that secure filter assembly (2) to the fuel cap. Remove filter assembly (2), valve (1), and the gaskets.

4. Wash the cap and the strainer in a clean, nonflammable solvent.

5. Inspect the tank cap seal. If the seal is damaged, replace the seal.

6. Replace the filter assembly, the valve, the gaskets, and the screws. Use a 9X-2205 Cap Filter Kit.

7. Install the strainer.

8. Install the fuel cap. Rotate the fuel cap clockwise until three tabs (5) drop into the slots in the adapter. Rotate lever (3) clockwise until the lever stops. Lower lever (3) over locking tab (4).

Fast Fill Fuel Adapter (If Equipped)

Illustration 272 g00682163

Illustration 273 g00682162

Machines that are equipped with the fast fill fuel adapter have a filler cap that is not vented. There are no filters in the cap.

i01286824

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Illustration 274 g00682228

The drain valve is under the fuel tank at the rear of the machine.

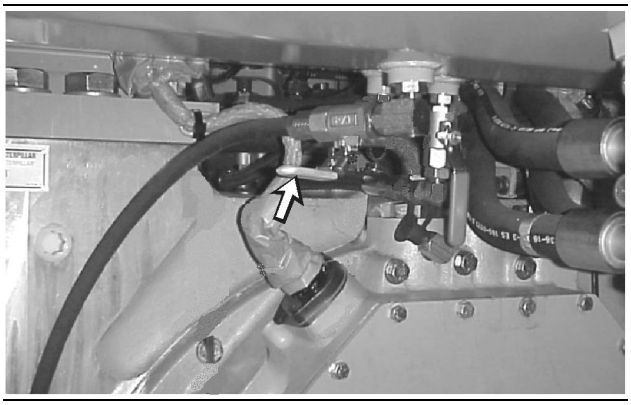


Illustration 275 g00678463

1. Open the drain valve. Allow the water and the sediment to drain into a suitable container.
2. Close the drain valve.

i01251367

Fuses and Circuit Breakers - Replace/Reset

SMCS Code: 1417-510; 1420

Fuses – Fuses protect the electrical system from damage that is caused by overloaded electrical circuits. Replace a fuse if the element separates. If the fuse of a particular electrical system requires frequent replacement, check the electrical circuit. Repair the electrical circuit, if necessary.

NOTICE
Always replace fuses with the same type and capacity fuse that was removed. Otherwise, electrical damage could result.

NOTICE
If it is necessary to replace fuses frequently, an electrical problem may exist.

Contact your Caterpillar dealer.

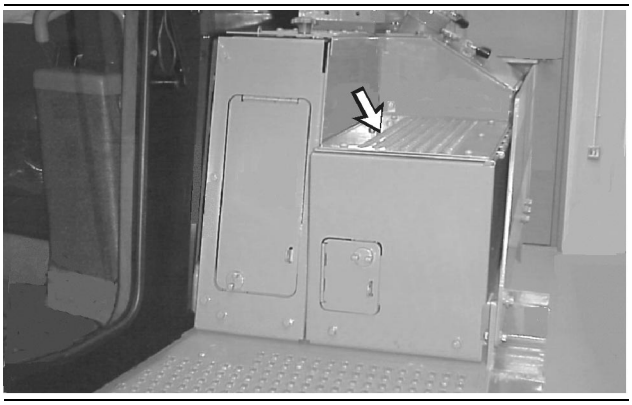


Illustration 276 g00666722

Raise the battery box cover for access to the circuit breakers and the fuses.

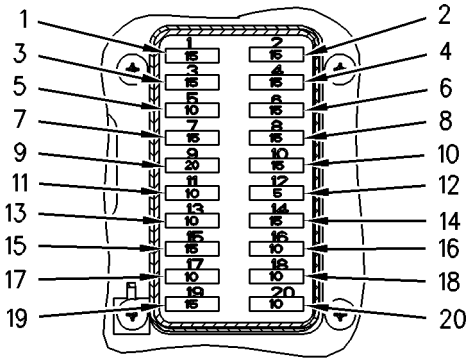


Illustration 277 g00666736
Fuses

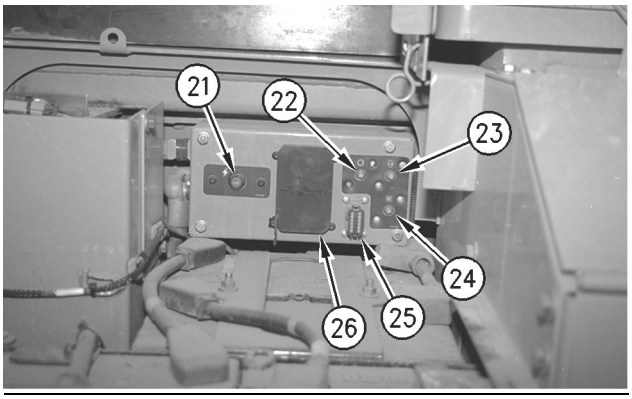


Illustration 278 g00666732
Circuit breakers

Fuses are located behind cover (26).

Fuse listing:

Ignition Key (1) – 15 Amp

Forward Horn (2) – 15 Amp

Service Brake (3) – 15 Amp

MSS (4) – 15 Amp

Auxiliary (5) – 10 Amp

Front Flood Lights (6) – 15 Amp

Auxiliary (7) – 15 Amp

Fender Floodlights (8) – 15 Amp

24V – 12V Converter (9) – 20 Amp

Rear Flood Lights (10) – 15 Amp

Converter (11) – 10 Amp

Priming Pump (12) – 5 Amp

Auxiliary (13) – 10 Amp

Winch (14) – 15 Amp

Auxiliary (15) – 15 Amp

Refrigerant Condenser (16) – 20 Amp

Blowers (17) – 20 Amp

Wipers (18) – 10 Amp

RPR – Pin/Seat/Winch (19) – 15 Amp

EMS (20) – 10 Amp

Circuit breaker listing:

Alternator (21) – Circuit Breaker

Power Train ECM (22) – Circuit Breaker

Engine ECM Switched (23) – Circuit Breaker

Engine ECM Unswitched (24) – Circuit Breaker

Plug listing:

Starting/Charging Circuit Analyzer Plug (25) Plug

i01253415

Horn - Test

SMCS Code: 7402-081

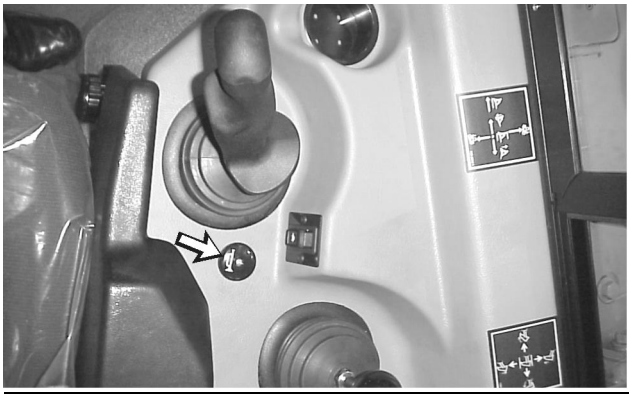


Illustration 279 g00679579

Push the switch downward in order to sound the forward horn.

i01522024

Hydraulic System Oil - Change

SMCS Code: 5050-044

WARNING

At operating temperature, the hydraulic tank is hot and under pressure.

Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.

Remove the filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand. Remove the filler cap slowly to relieve pressure.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Operate the machine in order to warm the oil.

Park the machine on level ground. Lower the bulldozer blade and the ripper to the ground and apply slight downward pressure. Engage the parking brake and stop the engine.

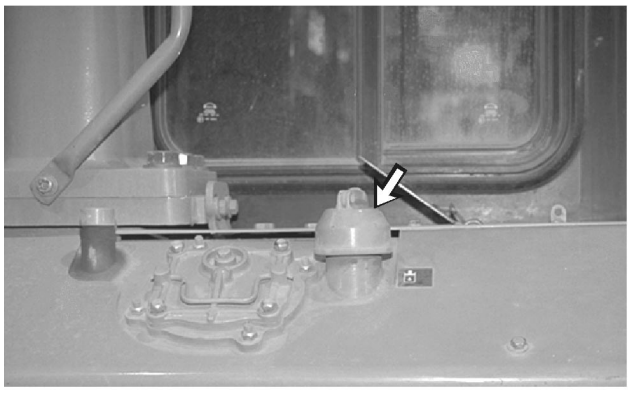


Illustration 280 g00666824

1. Remove the hydraulic tank filler cap slowly in order to relieve any pressure.

2. Wash the filler strainer and the filler cap in a clean nonflammable solvent.

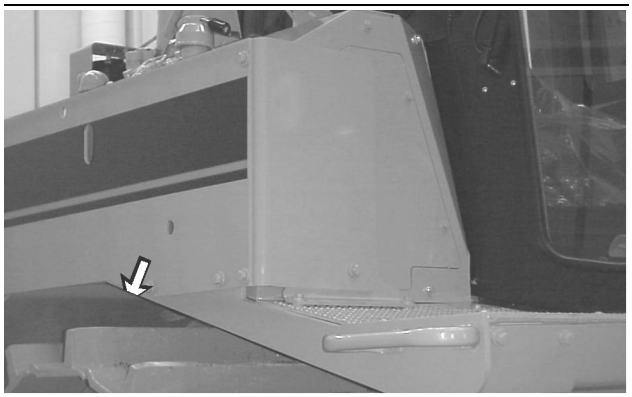


Illustration 281 g00666825

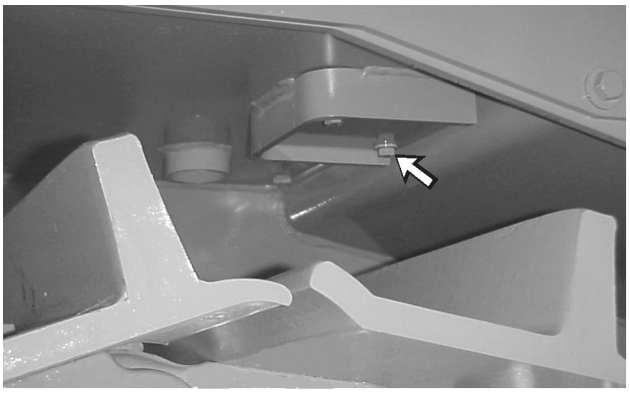


Illustration 282 g00678610

3. Remove the oil drain plug cover. Remove the oil drain plug. The oil drain plug is located under the right fender.

4. Attach a hose to a **126-7914** Swivel. Install the swivel and the hose into the drain plug opening. A pipe nipple 10 cm (4 inch) and a hose can also be used. Use a 25.4 mm (1 inch) pipe with 1-11 1/2 NPTF threads. Do not tighten the pipe.

5. Rotate the swivel clockwise in order to open the internal drain valve. Allow the oil to drain into a suitable container.

6. Remove the swivel. The valve for the hydraulic tank will close.

7. Clean the drain plug and install the drain plug. Tighten the drain plug to a torque of 68 ± 7 N·m (50 ± 5 lb ft). Install the oil drain plug cover.

8. Change the hydraulic system filter. See the Operation and Maintenance Manual, “Hydraulic System Oil Filter - Replace”.

9. Install the filler strainer.

10. Fill the hydraulic oil tank. See the Operation and Maintenance Manual, “Refill Capacities” in order to determine the amount of hydraulic oil that is needed to fill the hydraulic oil tank.

11. Inspect the filler cap gasket. Replace the gasket if damage or wear is evident.

12. Install the filler cap.

13. Start the engine. Run the engine for a few minutes.

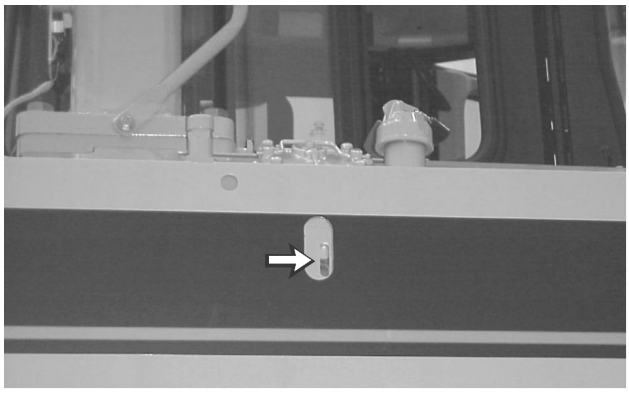


Illustration 283 g00666826

14. Maintain the oil level to the “FULL” mark in the sight gauge. Check with the attachments on the ground and with cold oil. Add oil, if necessary.

15. Stop the engine.

For additional information about hydraulic system oil, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01522028

Hydraulic System Oil Filters - Replace

SMCS Code: 5068-510

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

1. Lower the bulldozer and the ripper to the ground.

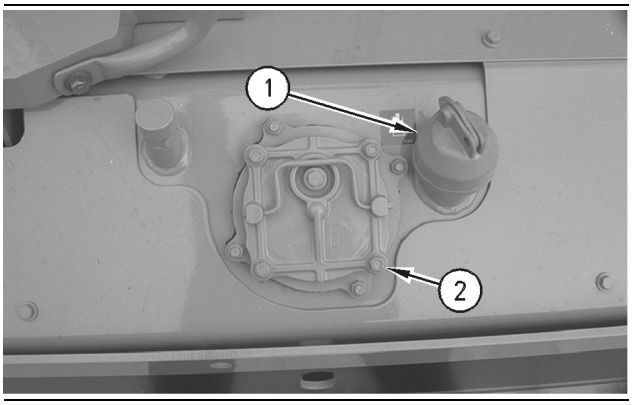


Illustration 284 g00481279

2. Remove oil filler cap (1) in order to relieve the tank pressure. Remove the filler strainer.

3. Remove four bolts (2) in order to remove the cover from the case drain filter.

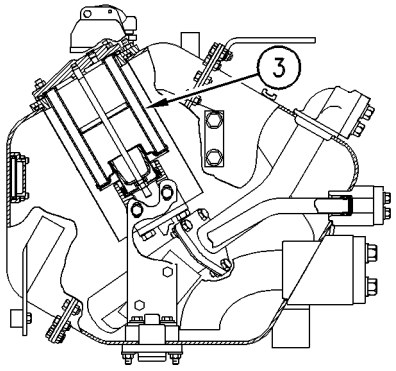


Illustration 285 g00481304

4. Remove case drain filter (3) and properly discard the case drain filter.

5. Clean the strainer, the filter housing, and the oil filler cap in a clean, nonflammable solvent.

6. Install a new case drain filter.

7. Install the strainer.

Illustration 286 g00681359

8. Open the access door on the left side of the machine.

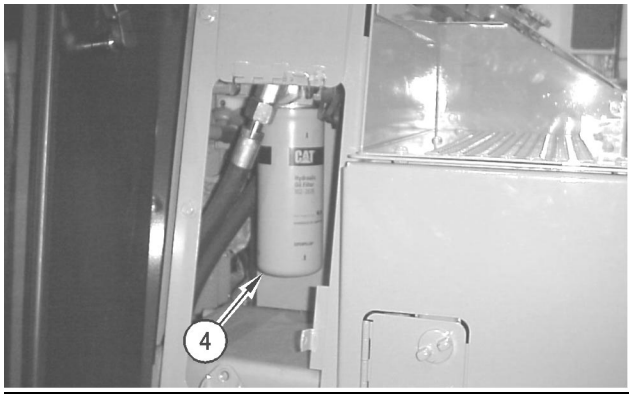


Illustration 287 g00681373

9. Remove hydraulic oil filter (4) and discard the hydraulic oil filter properly. Make sure that all of the old filter seal is removed from the filter base.

10. Clean the filter base with a clean cloth.

11. Apply a thin coat of oil to the seal on the new filter. Install the new hydraulic oil filter element by hand. When the gasket contacts the filter base, tighten the filter element by an additional 3/4 turn (270 degrees). Rotation index marks are on the new filter element. These rotation index marks are spaced at 90 degree intervals. Use these rotation index marks as a guide for proper tightening.

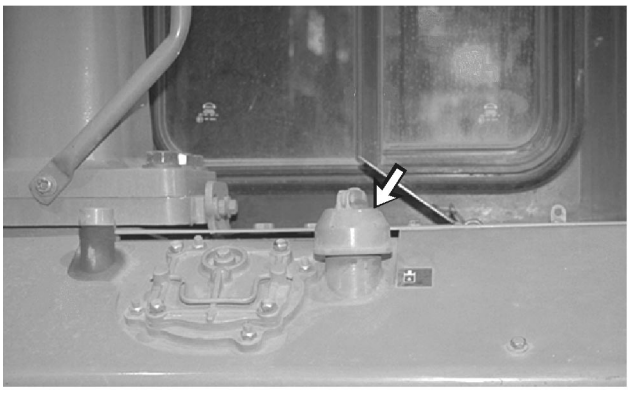


Illustration 288 g00666824

12. Fill the hydraulic system with new oil. See Operation and Maintenance Manual, “Refill Capacities”. Install the oil filler cap.

13. Start the engine.

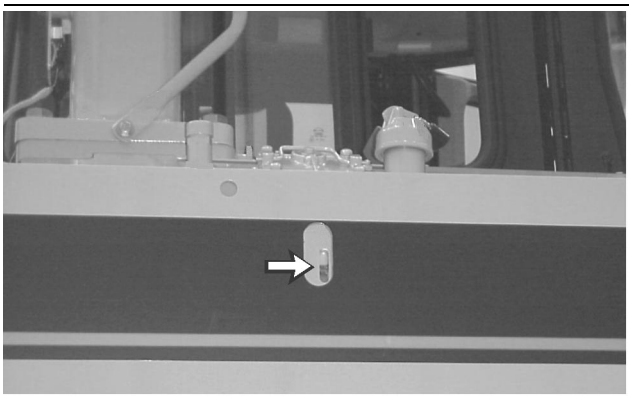


Illustration 289 g00666826

14. Maintain the oil level to the “FULL” mark in the sight gauge. Check with the attachments on the ground and cold oil. Add oil, if necessary.

15. Stop the engine.

16. Close the access door.

For additional information about hydraulic system oil, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01507389

Hydraulic System Oil Level - Check

SMCS Code: 5056-535-FLV; 7479

⚠ WARNING

At operating temperature, the hydraulic tank is hot and under pressure.

Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.

Remove the filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand. Remove the filler cap slowly in order to relieve pressure.

Lower the bulldozer and the ripper to the ground. Place the ripper shanks in the vertical position.

The hydraulic tank is on the right rear side of the machine.

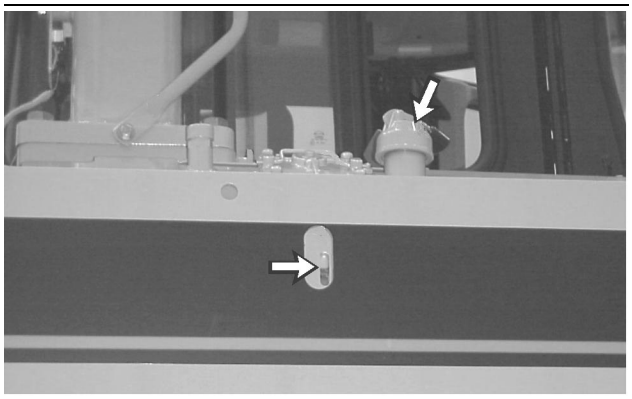


Illustration 290 g00667913

1. Maintain the oil level to the “FULL” mark in the sight gauge. Check the oil level when the oil is cold. Verify that the oil level is below the “FULL” mark before you remove the filler cap.
2. If the hydraulic system requires additional hydraulic oil, remove the filler cap slowly in order to relieve the pressure. Add oil through the filler tube.
3. Clean the filler cap and install the filler cap.

i01522033

Hydraulic System Oil Sample - Obtain

SMCS Code: 5050-008; 7542-008

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Obtain the hydraulic oil sample as close as possible to the recommended sampling interval. The recommended sampling interval is every 500 service hours. In order to receive the full effect of S·O·S oil analysis, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent oil samplings that are evenly spaced.

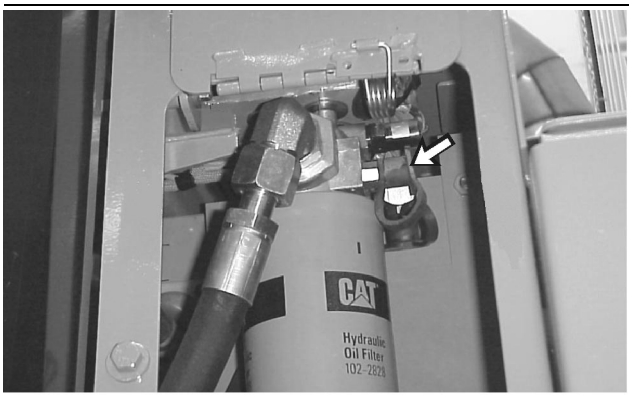


Illustration 291 g00680462

1. Open the access door that is located on the left side of the machine between the cab and the battery compartment.
2. Remove the protective cap.

3. Use an 8T-9190 Fluid Sampling Bottle to obtain the sample.

4. After you take a sample, remove the cap with the tube and the probe from the bottle. Discard the cap with the tube and the probe. Install the sealing cap that is provided with 8T-9190 Fluid Sampling Bottle.

5. Replace the protective cap.

6. Close the access door.

For additional information about hydraulic system oil, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01254477

Indicators and Gauges - Test

SMCS Code: 7450-081

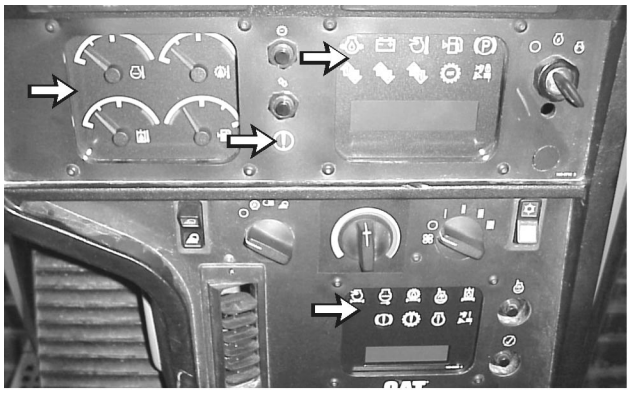


Illustration 292 g00668604

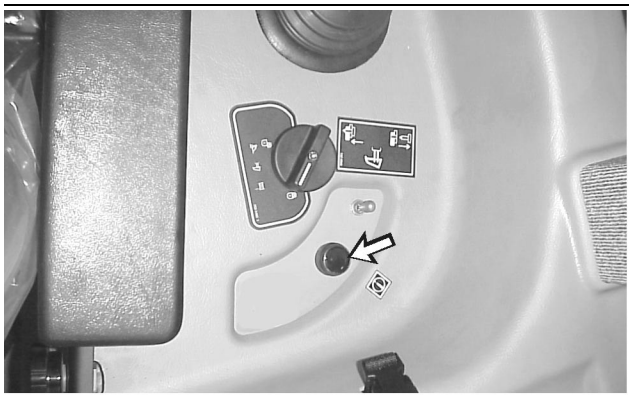


Illustration 293 g00683490

Action light in the console

Inspect the dash panel for broken lenses, indicator lights, and switches.

CMS Functional Test

To ensure proper operation of the CMS, check the system on a daily basis.

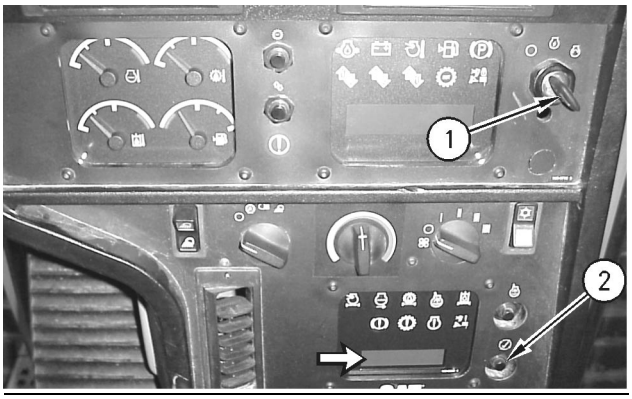


Illustration 294 g00668606

On – The battery disconnect switch must be ON in order to supply electrical power to the machine so that the electrical systems will function.

On – The engine start switch key (1) must be turned to the ON position in order to supply electrical power to the operator’s compartment so that the CMS will function.

Turn the engine start key to the ON position. The system should act in the following manner:

- The indicator lights on the top portion of the instrument panel come on briefly.
- The action light comes on briefly.
- The auxiliary action light comes on briefly.
- The indicator lights on the bottom portion of the instrument panel flash briefly.
- The action alarm sounds briefly.
- The pointers on the gauges point upward. Then, the pointers point to the left. Then, the pointers point to the right. Then, the pointers point to the final position.

If the system functions properly, start the engine. If any of the following events occur, do not start the engine:

- The indicator lights on the top portion or the bottom portion of the instrument panel do not come on.
- The action light does not come on.

- The auxiliary action light does not come on.
- The action alarm does not sound.

Complete any necessary repairs before you start the engine.

Panel Test Switch – With a stopped engine, push on test switch (2). Service hours will appear in the display area until the switch is pushed. Push the switch and release the switch until the desired information appears in the display area. The following type of information is displayed:

- Total Service Hours
- Service hours in forward gear
- Service hours in reverse gear
- Fault codes

i01253519

Lift Cylinder Yoke Bearings - Lubricate

SMCS Code: 5102-086-BD

Illustration 295 g00667941

The fittings are on the left front side of the machine and on the right front side of the machine. Lubricate the bearings by applying grease to the two fittings. Use MPGM Grease.

i01054847

Oil Filter - Inspect

SMCS Code: 1318-507; 3067-507; 5068-507

Inspect A Used Filter for Debris

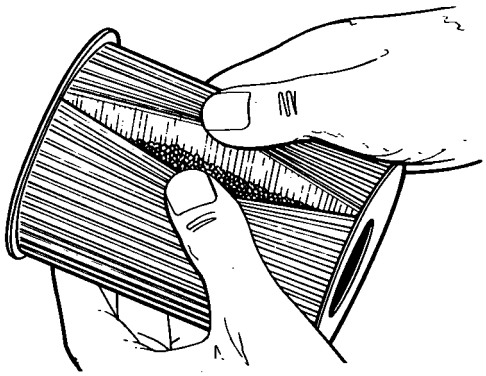


Illustration 296 g00100013

The element is shown with debris.

Use a 4C-5084 Filter Cutter to cut the filter element open. Spread apart the pleats and inspect the element for metal and for other debris. An excessive amount of debris in the filter element can indicate a possible failure.

Small amounts of debris may be found in the filter element. This could be caused by normal wear. Small amounts of material will be especially noticeable during the first 500 hours of operation.

If metals are found in the filter element, a magnet can be used to differentiate between ferrous metals and nonferrous metals. Ferrous metals can indicate wear on steel parts and on cast iron parts. Nonferrous metals can indicate wear on aluminum or on other nonferrous parts. Consult your Caterpillar dealer in order to arrange for further analysis if an excessive amount of debris is found.

Using an oil filter element that is not recommended by Caterpillar can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause severe damage to the engine, the power train, or the hydraulic system components.

i01253560

Pivot Shaft Oil Level - Check

SMCS Code: 4153-535-FLV

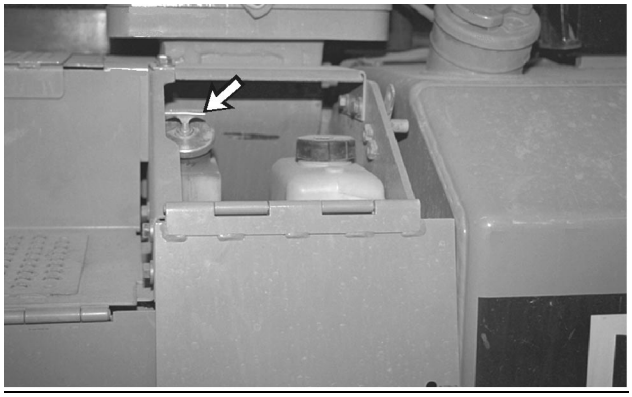


Illustration 297 g00667972

Open the access door on the left fender.

Maintain the oil level to the FULL mark on the dipstick.

To fill the reservoir, add oil through the dipstick opening.

i00058126

Radiator Core - Clean

SMCS Code: 1353-070; 1805; 1810

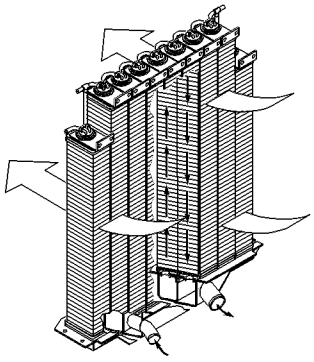


Illustration 298 g00100624

You can use compressed air, high pressure water, or steam to remove dust and other debris from the radiator core. However, the use of compressed air is preferred.

See Special Publication, SEBD0518, “Know Your Cooling System” for the complete procedure for cleaning the radiator core.

i01107744

Radiator Guard Pin Joint - Inspect

SMCS Code: 7155-040

1. Park on a level surface.
2. Raise the bulldozer blade.

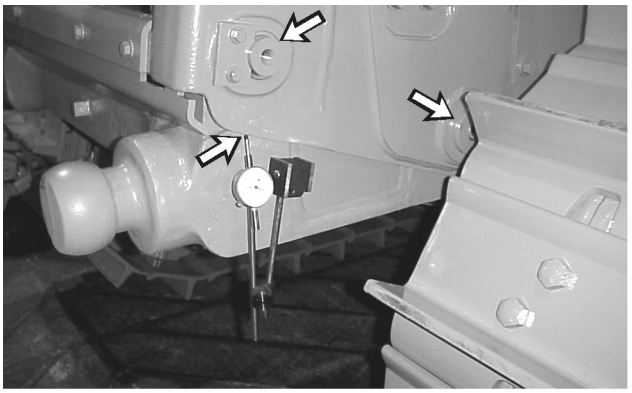


Illustration 299 g00584863

3. Install the magnetic base of a dial indicator on the main frame of the machine. Place the tip of the indicator on the bottom edge of the radiator guard directly beneath one of the pins.
4. Lower the bulldozer blade. Apply sufficient down pressure in order to raise the front of the machine off the ground.
5. If the travel of the indicator is more than 1 mm (0.04 inch), replace the pin and replace the bushing.
6. Check the other three pin locations. Contact your Caterpillar dealer for service.

i00925827

Radiator Pressure Cap - Clean/Replace

SMCS Code: 1353-070-Z2; 1353-510-Z2

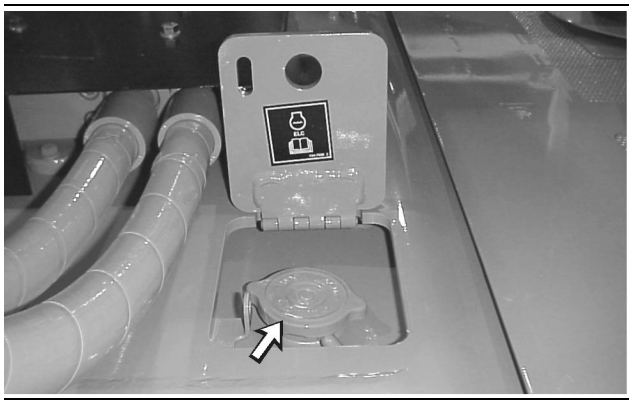


Illustration 300 g00581795

1. Slowly remove the radiator cap in order to relieve system pressure.
2. Inspect the radiator cap for damage, for deposits, or for foreign material. Clean the radiator cap with a clean cloth. Replace the radiator cap if the radiator cap is damaged.
3. Install the radiator cap.

i01252215

Recoil Spring Compartment Oil Level - Check

SMCS Code: 4158-535

WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

Illustration 301 g00667233

1. Remove all of the debris around the cover plate on the top of the track roller frame.
2. Remove the cover plate for the oil filler. The dipstick is part of the cover plate.

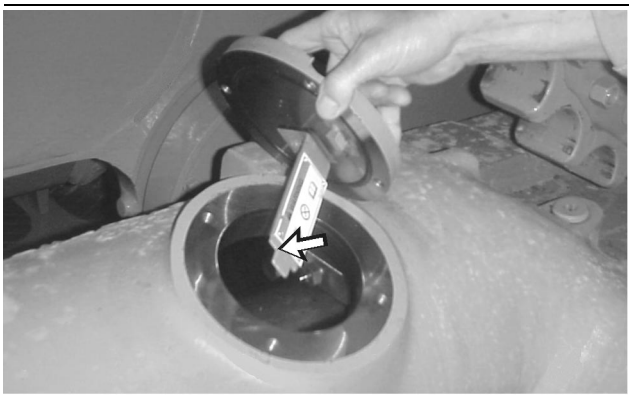


Illustration 302 g00689382

3. Maintain the oil level to the level “FULL” mark (first step) on the dipstick.
4. Install the cover plate.
5. Repeat the procedure for the other recoil compartment.

i01286780

Ripper Linkage and Cylinder Bearings - Lubricate

SMCS Code: 6313-086-BD, L4

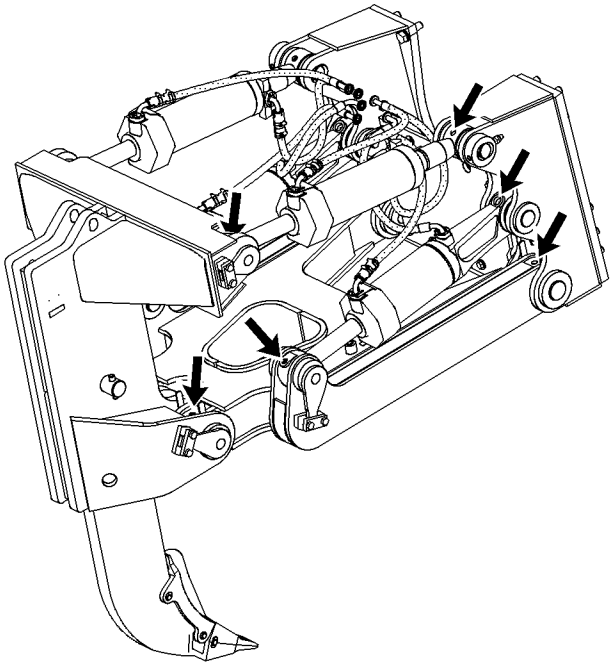


Illustration 303 g00681900

Lubricate twelve grease fittings (six per side). Use MPGM Grease.

i00925689

Ripper Tip and Shank Protector - Inspect/Replace

SMCS Code: 6808-040; 6808-510; 6810; 6812-040; 6812-510

If equipped:

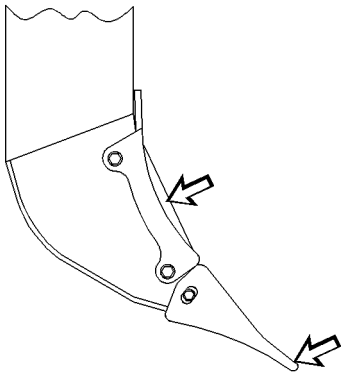


Illustration 304 g00550432

When the ripper tip is worn close to the shank, replace the ripper tip. When the shank protector is worn close to the shank, replace the shank protector. If the tip is too blunt, the tip will not penetrate properly.

1. Raise the ripper. Place blocking under the ripper. Lower the ripper onto the blocking. The ripper should be high enough so that the ripper tip or the shank protector can be removed. Do not place the ripper too high.
2. If the ripper tip is worn, drive out the pin. Remove the tip and the shank pin retainer.
3. Clean the shank pin retainer and the pin.
4. Install the new tip and the retainer.
5. Install the pin from the opposite side of the retainer.
6. If the shank protector is worn, drive out the pins. Remove the shank protector.
7. Clean the pin retainers and the pins.
8. Install the new shank protector and the retainers.
9. Install the pins from the opposite side of the retainer.
10. Raise the ripper and remove the blocking.
11. Lower the ripper to the ground.

i01252281

Rollover Protective Structure (ROPS) and Falling Object Protective Structure (FOPS) - Inspect

SMCS Code: 7325-040

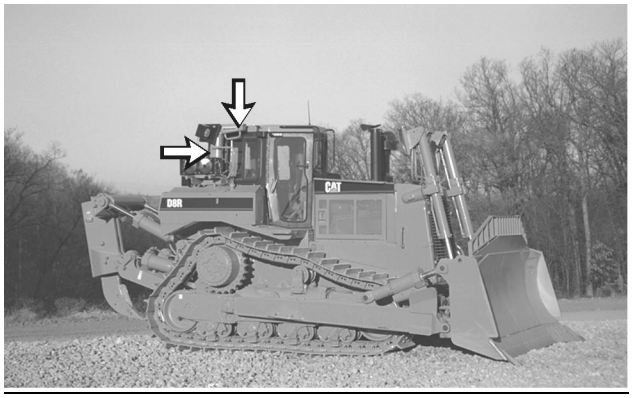


Illustration 305 g00667247

Inspect the Rollover Protective Structure (ROPS)/Falling Object Protective System (FOPS) for bolts that are loose or damaged. Replace any damaged bolts and any missing bolts with original replacement parts only. Tighten the bolts to a torque of 1300 ± 150 N·m (950 ± 100 lb ft).

Note: Apply oil to all bolt threads for the ROPS/FOPS before you install the bolts. Improper bolt torque can result if you do not apply oil to the threads.

Do not weld reinforcement plates to the ROPS/FOPS in order to straighten the ROPS/FOPS. Do not weld reinforcement plates to the ROPS/FOPS in order to repair the ROPS/FOPS.

If the ROPS/FOPS has any cracks in the welds, in the castings, or in any metal section, consult your Caterpillar dealer for repairs.

i00038410

Seat Belt - Inspect

SMCS Code: 7327-040

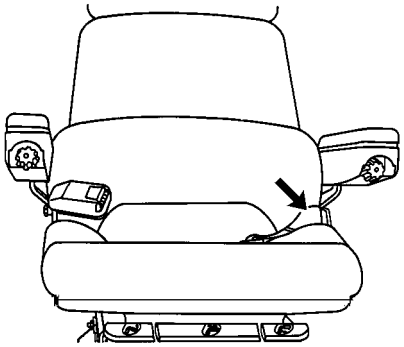


Illustration 306 g00040782

Always check the condition of the seat belt and the condition of the belt mounting hardware before you operate the machine.

Inspect the belt mounting hardware. Replace any belt mounting hardware that is damaged or worn.

Regardless of the appearance, replace the seat belt once during every three year interval.

i01075752

Seat Belt - Replace

SMCS Code: 7327-510

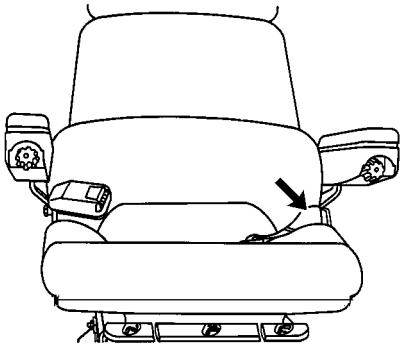


Illustration 307 g00040782

Regardless of the appearance, replace the seat belt once during every three year interval.

i01252315

Track - Check/Adjust

SMCS Code: 4170-036

Illustration 308 g00667264

Check the track adjustment. Check the track for wear and for excessive dirt buildup.

⚠ WARNING

Grease is under high pressure.

Grease coming out of the relief valve under pressure can penetrate the body causing injury or death.

Do not watch the relief valve to see if grease is escaping. Watch the track or track adjustment cylinder to see if the track is being loosened.

Loosen the relief valve only one turn.

1. Move the machine forward. Allow the machine to coast to a stop without the use of the service brakes. Adjust the tracks while you are in the machine's typical operating conditions. If packing conditions prevail on the workplace, the tracks should be adjusted without removing the packed material.

2. To measure the sag in the track, stretch a string over the grousers that are between the sprocket and the front idler. Take the measurement from the string to the top of the grouser at the maximum measurement. Dimension (2) is the maximum distance between the string and the grouser.

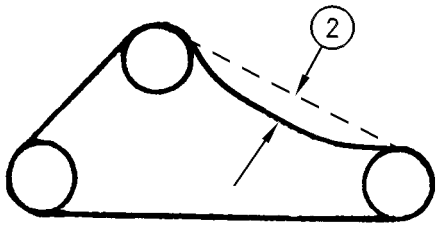


Illustration 309 g00040329

If a machine does not have carrier rollers, the sag in the track is measured between the sprocket and the front idler. The correct adjustment of dimension (2) is 115 ± 10 mm (4.5 ± .4 inch).

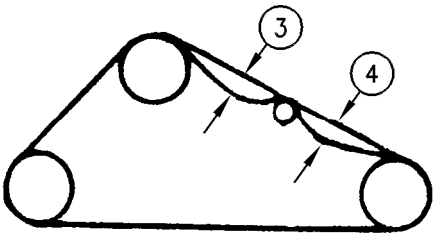


Illustration 310 g00104000

If the machine is equipped with a carrier roller, the correct adjustment of dimension (3) and dimension (4) is 65 ± 10 mm (2.6 ± .4 inch).

Loose Track Adjustment

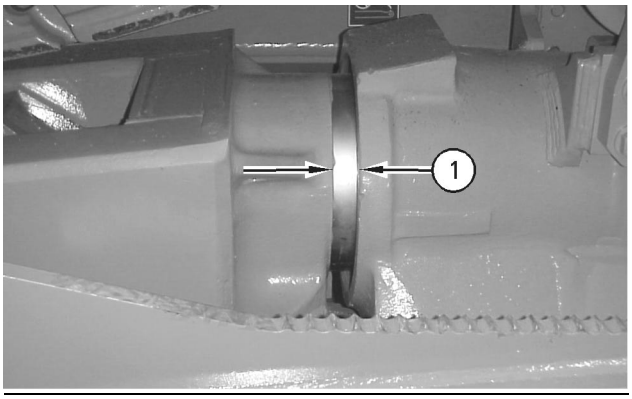


Illustration 311 g00680166

NOTICE
Do not attempt to tighten track when dimension (1) is 152 mm (6.0 inch) or more. Contact your Caterpillar dealer for track service or instructions.

1. Remove the access cover.

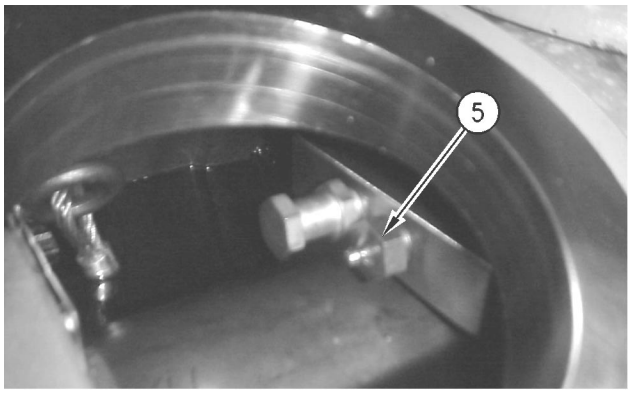


Illustration 312 g00689385

2. Add multipurpose grease (MPGM) through track adjustment valve (5). Add the MPGM until dimension (2) is correct.

3. Operate the machine back and forth in order to equalize the pressure. Allow the machine to coast to a complete stop. Do not use the brakes.

4. Remeasure dimension (2).

Tight Track Adjustment

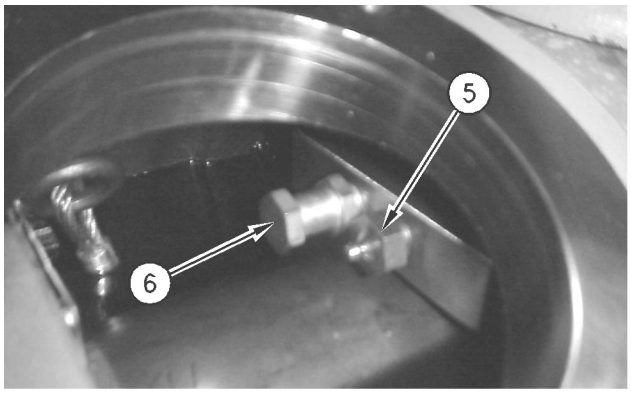


Illustration 313 g00689386

1. Loosen relief valve (6) by one turn of 360 degrees. Allow the grease to escape.

2. Close the relief valve.

3. Add MPGM through track adjustment valve (5). Add grease until dimension (2) is correct.

4. Install the access cover.

Bolt Torque for Track Shoes

The torque requirement for track shoe bolts is 650 ± 70 N·m (480 ± 50 lb ft). Tighten the bolts for an additional 120 degrees. If you are using bolts with a master link, tighten the bolts to a torque of 650 ± 70 N·m (480 ± 50 lb ft). Then, tighten the bolts for an additional 120 degrees.

i00936894

Track Pins - Inspect

SMCS Code: 4175-040-PN

⚠ WARNING

Fingers can be burned from hot pins and bushings.

The pins and bushings in a dry joint can become very hot. It is possible to burn the fingers if there is more than brief contact with these components.

Use the recommendations in order to extend the life of the undercarriage. Use the recommendations in order to avoid excessive downtime.

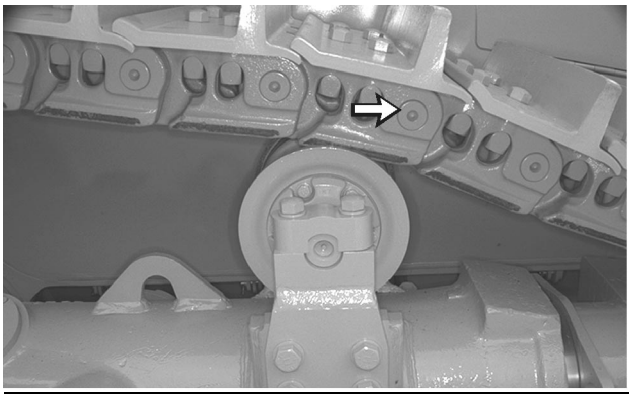


Illustration 314 g00477106

1. During the machine operation, listen for unusual squeaking and for unusual squealing. This can indicate a dry joint.

2. Check the machine for dry joints weekly. Check for dry joints immediately after machine operation. After machine operation, lightly touch the end of each track pin or bushing. Touch the track pin or the track bushing with the back of your hand. Make a mark on any dry track pin joint that is very hot to the touch.

3. Do not hit the ends of the track pins with a sledge hammer in order to loosen the track joints.

NOTICE
Striking the end of a track pin introduces a significant amount of end play into the track joint and can result in early failures.

Consult your Caterpillar dealer's Custom Track Service expert if you detect dry joints or leaks. Your Caterpillar dealer's Custom Track Service expert can perform track inspection.

i01513276

Track Roller Frame Guides - Inspect

SMCS Code: 4177-040

Measure the rotational movement of the front roller frame relative to the rear roller frame.

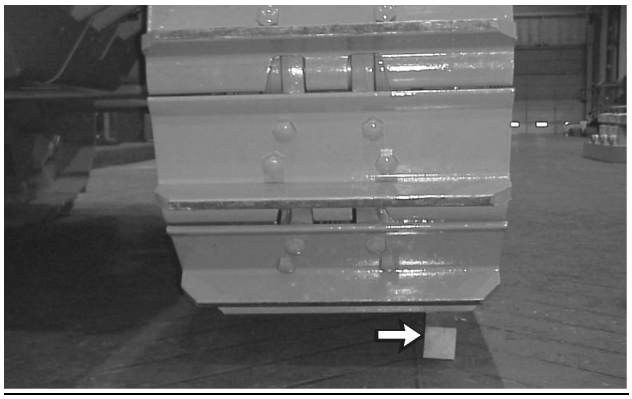


Illustration 315 g00581644

1. Raise the front of the machine with the hydraulics of the dozer. Place a 100 mm (4 inch) block under the outside edge of a track grouser. Place the block near the track idler. Lower the machine onto the block.

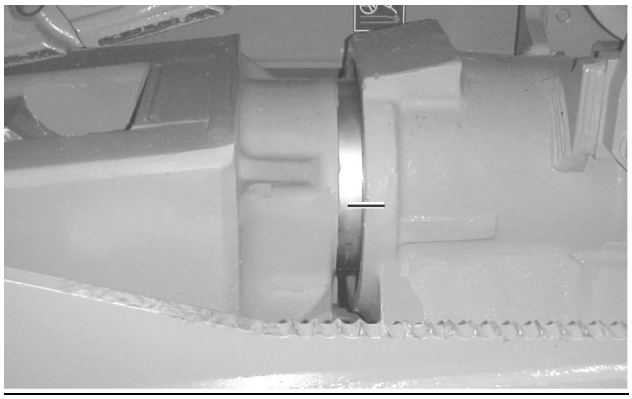


Illustration 316 g00681200

2. Use a grease pencil to make a mark on the tubular section of the front roller frame. Make a mark on the rear of the roller frame. This mark should correspond with the mark that is on the tubular section.

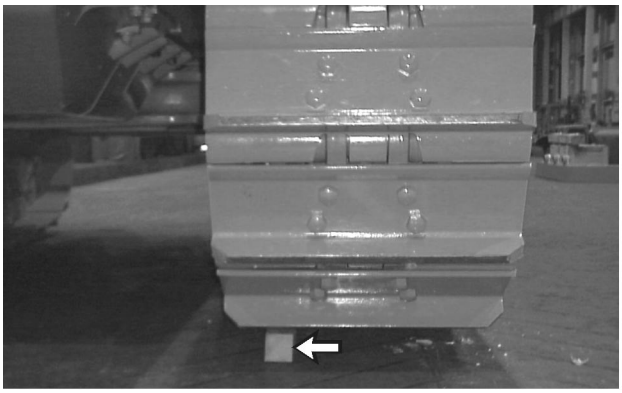


Illustration 317 g00581643

3. Raise the front of the machine with the hydraulics of the dozer. Place the block under the inside edge of the same track grouser. Lower the machine onto the block.

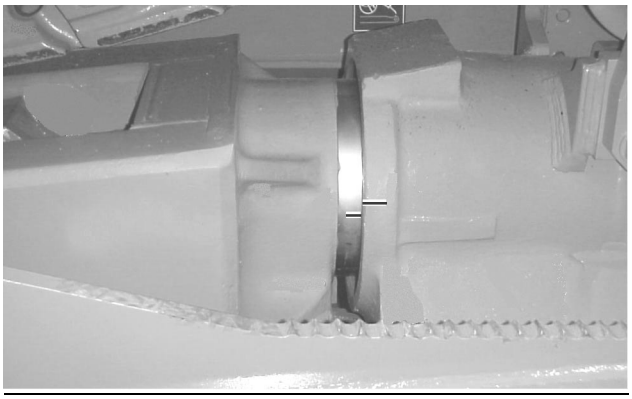


Illustration 318 g00681204

4. Put a mark on the tubular section of the front roller frame. This mark should correspond with the mark on the rear roller frame. Measure the distance between the two marks on the front roller frame.

If the distance between the two marks is greater than 4.5 mm (.18 inch), inspect the track roller frame guides for wear.

Repeat the entire procedure for the other side of the machine.

NOTICE
Never build up the track roller frame guides with hard-face welding. This will cause serious wear damage to the guide slots in the front track roller frame.

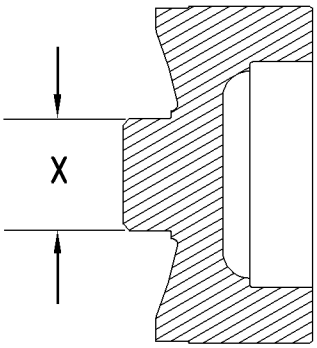


Illustration 319 g00785460

If dimension (X) is less than 45.3 mm (1.78 inch), replace the track roller frame guides. Consult your Caterpillar dealer for information or for service.

i01253438

Transmission Breather - Clean

SMCS Code: 3030-070; 3177-070

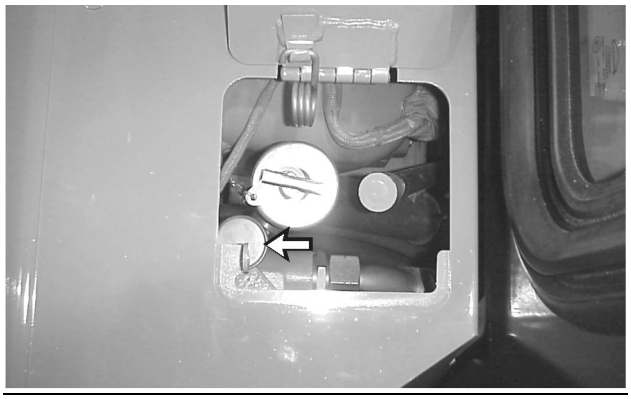


Illustration 320 g00679604

1. Open the access cover for the transmission fill tube on the right side of the machine. Unscrew and remove the breather.
2. Clean the breather in clean, nonflammable solvent.
3. Install the breather and close the cover.

i01275664

Transmission System Oil Filter - Replace

SMCS Code: 3067-510

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

If the filter light in the CMS panel comes on before 500 hours, the filters should be changed.

The transmission oil filters are located behind the access cover on the right side of the machine.

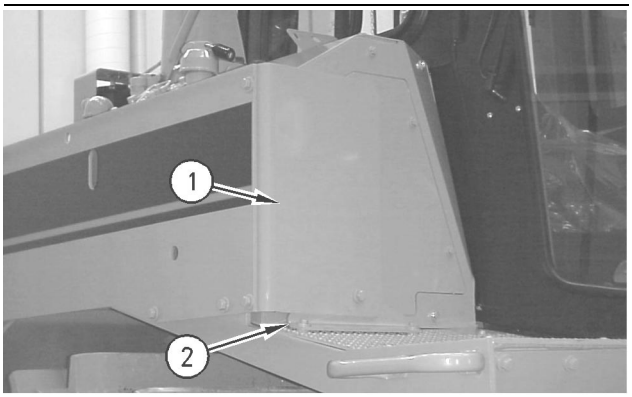


Illustration 321 g00680810

1. Remove guard (1) and mounting bracket (2) on the right fender.

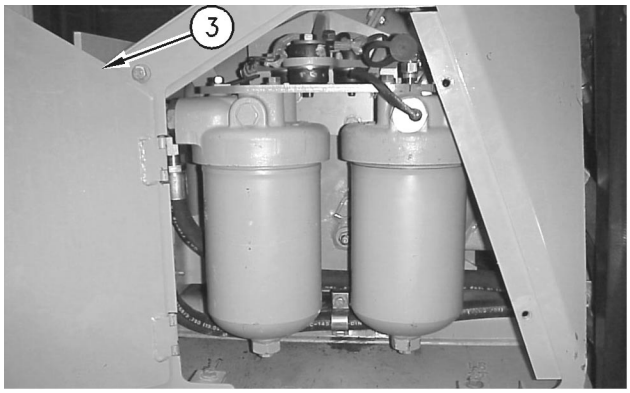


Illustration 322 g00680833

2. Open access door (3).

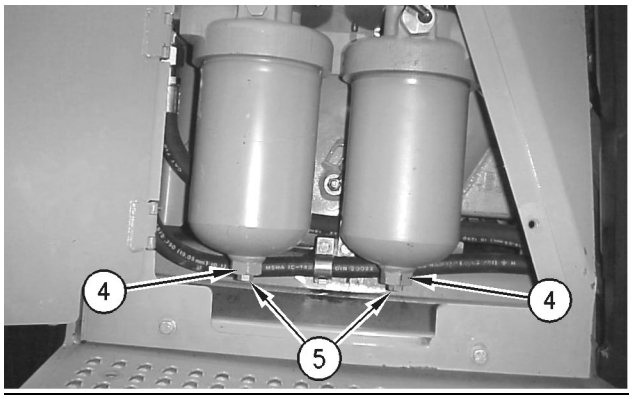


Illustration 323 g00680838

3. Remove drain plugs (5) in order to remove a small amount of oil. Use a wrench in order to remove filter housings (4).

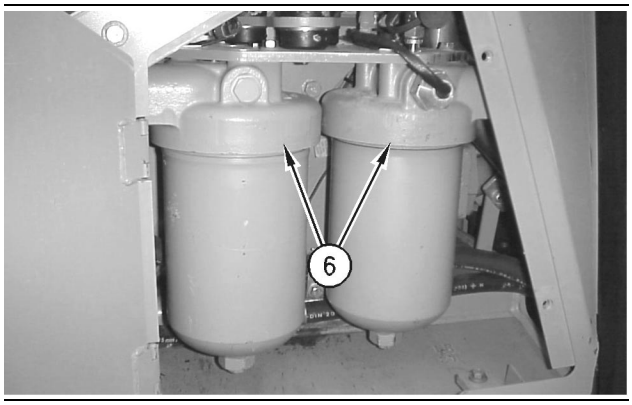


Illustration 324 g00680850

4. Remove the filter elements and properly discard the filter elements.

5. Clean the filter element housings and clean filter bases (6) with a clean cloth.

6. Inspect the seals. If the seals are damaged, replace the seals.

7. Install new filter elements. Install the filter element housing covers.

8. Start the engine.

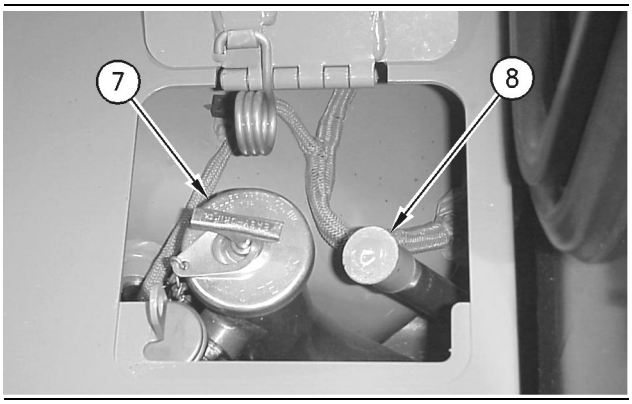


Illustration 325 g00680891

9. Check the oil.

HOT OIL:

Use the “TRANSMISSION IN NEUTRAL, ENGINE AT LOW IDLE, AND OIL AT OPERATING TEMPERATURE” side of the dipstick (8). Check when the transmission is in NEUTRAL and the engine is running at LOW IDLE. The oil should be at operating temperature. Maintain the oil level between the “OPERATING ZONE” marks. This is the only accurate way to check the oil level.

COLD OIL:

Check the “ENGINE STOPPED COLD OIL” side of the dipstick (8) while the engine is stopped. Maintain the oil between the “OPERATING ZONE” marks. This method should be used as reference only.

10. Remove filler cap (7). If necessary, add oil.

11. Clean the filler cap and install the filler cap.

12. Close the access door.

i01253722

Transmission System Oil Level - Check

SMCS Code: 3030-535-FLV; 3080-535-FLV

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

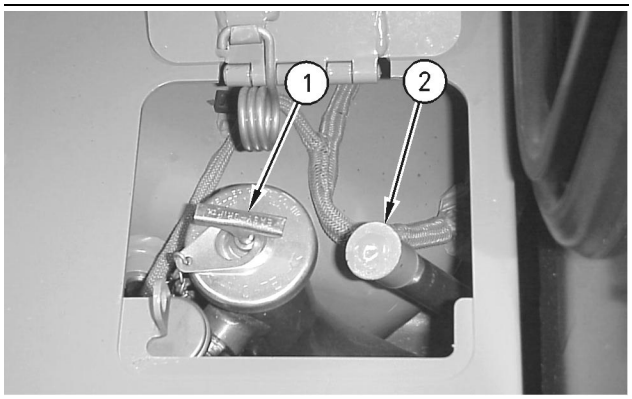


Illustration 326 g00668110

The transmission oil dipstick is behind the access door on the right side of the operator's station.

Open the access door and check the transmission oil level.

Hot Oil

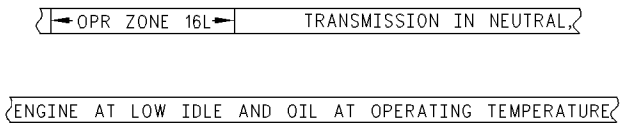


Illustration 327 g00493905

Use the "TRANSMISSION IN NEUTRAL, ENGINE AT LOW IDLE, AND OIL AT OPERATING TEMPERATURE" side of the dipstick (2). Check when the transmission is in NEUTRAL and the engine is running at LOW IDLE. The oil should be at operating temperature. Maintain the oil level between the "OPERATING ZONE" marks. This is the only accurate way to check the oil level.

Cold Oil

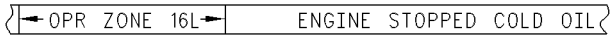


Illustration 328 g00493912

Check the "ENGINE STOPPED COLD OIL" side of dipstick (2) while the engine is stopped. Maintain the oil between the "OPERATING ZONE" marks. This method should be used as reference only.

Note: When you are operating the machine on severe slopes, the quantity of oil in the transmission can be increased up to 10 percent. When you are operating with the increased oil quantity, prolonged operation in some machines can cause high transmission oil temperatures. After the work on the severe slopes has been completed, drain the excessive oil quantity from the bevel gear case.

1. If the oil level on dipstick (2) indicates that oil is needed, remove filler cap (1) and add the oil.
2. Clean the filler cap and install the filler cap.
3. Close the access door.

i01522043

Transmission System Oil Sample - Obtain

SMCS Code: 3030-008; 7542-008

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Obtain the sample of the transmission oil as close as possible to the recommended sampling interval. The recommended sampling interval is every 500 service hours. In order to receive the full effect of S·O·S oil analysis, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent oil samplings that are evenly spaced.

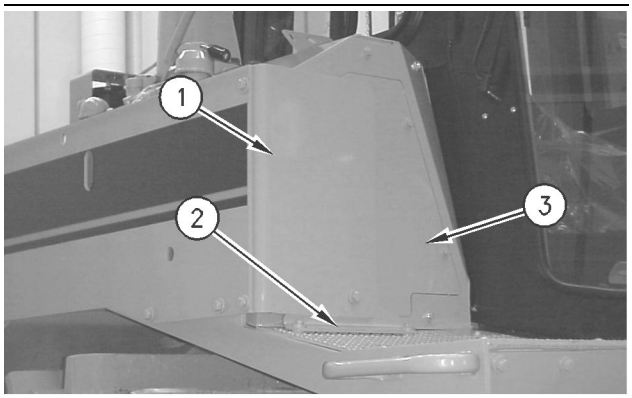


Illustration 329 g00680798

1. Remove the bolts and guard (1). Remove the bolts and bracket (2).

2. Remove the bolts and open the access door (3).

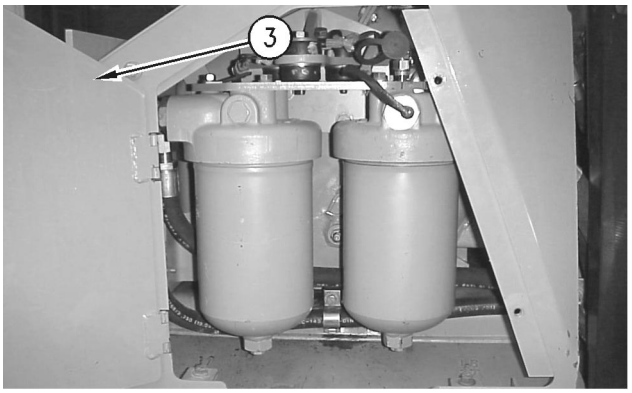


Illustration 330 g00680799

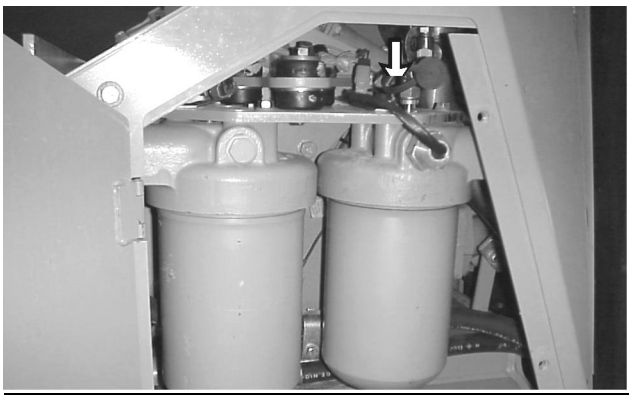


Illustration 331 g00680801

3. Remove the protective cap from the sampling port.

4. Use **169-8373** Fluid Sampling Bottle in order to obtain a sample.

5. After you take a sample, remove the cap with the tube and the probe from the bottle. Discard the cap with the tube and the probe. Install the sealing cap that is provided with **169-8373** Fluid Sampling Bottle.

6. Replace the protective cap.

7. Close the access door and install the bolts that secure the door. Replace the bracket and the guard.

For additional information about transmission system oil, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01506828

Transmission System Oil and Screens - Change/Clean

SMCS Code: 3030

WARNING

At operating temperature, the hydraulic tank is hot and under pressure.

Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.

Remove the filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand. Remove the filler cap slowly to relieve pressure.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Drain the Oil and Change the Transmission Oil Filter Elements

Operate the machine in order to warm the power train oil. The machine must be level. Lower the attachments with slight down pressure.

See the Topic “Transmission System Oil Filter - Replace” in this manual for the procedure to change the filters.

Illustration 332 g00680517

Use a 126-7538 Nozzle if the machine is equipped with the high speed oil change system. The high speed oil change system removes oil from the sump in the bevel gear case. The high speed oil change system does not remove oil from the torque converter or from the transmission case.

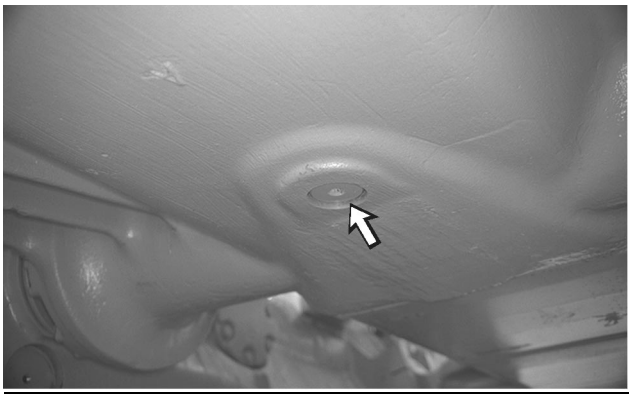


Illustration 333 g00484767

1. Remove the plug from the drain in the bevel gear case. Install a 4C-8563 Swivel into the valve. Clamp a hose to the swivel. A 25.4 mm (1 inch) pipe and hose can be used. Use a 25.4 mm (1 inch) pipe with 1-11 1/2 NPTF threads. Do not tighten the pipe.

2. Turn the swivel or pipe clockwise in order to open the internal drain valve. Allow the oil to drain into a suitable container.

3. Remove the rear bottom guard.

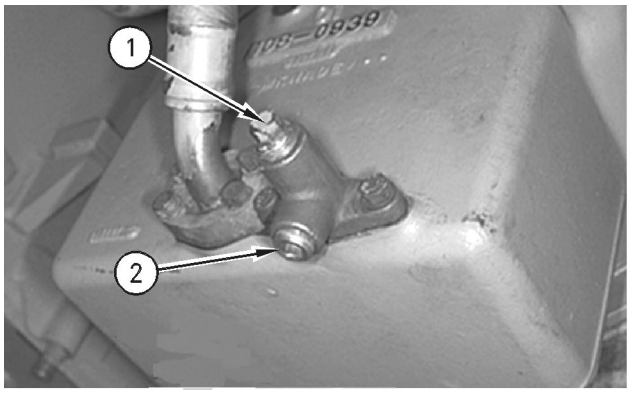


Illustration 334 g00484821

4. Remove plug (2) from the drain valve in the torque converter. Install a 12.7 mm (.5 inch) pipe into the drain valve. Use a 12.7 mm (0.50 inch) pipe with 1/2-14 NPTF threads.

5. Clamp a hose to the pipe in order to drain the oil into a suitable container.

6. Open drain valve (1) and drain the oil into a suitable container.

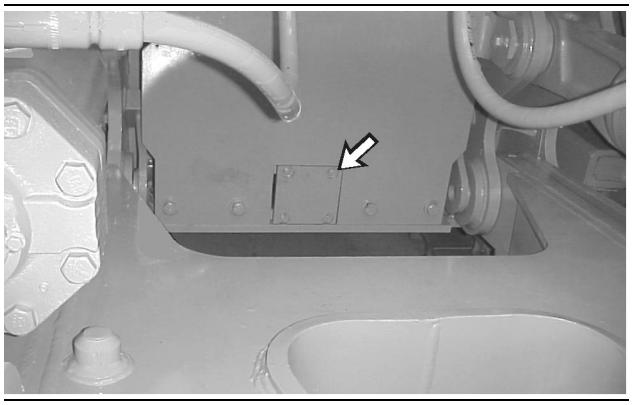


Illustration 335 g00680528

Illustration 336 g00680646

7. Remove the access cover for the transmission drain. Remove the plug in the guard for access to the drain valve.

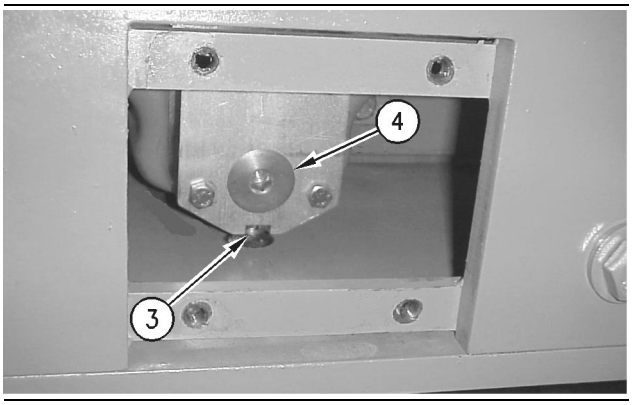


Illustration 337 g00680657

8. Remove plug (3) from the drain valve in the transmission. Install a 12.7 mm (.5 inch) pipe into the transmission valve. Use a 12.7 mm (0.50 inch) pipe with 1/2-14 NPTF threads. Clamp a hose to the pipe in order to drain the oil into a suitable container.

9. Open drain valve (4) and drain the oil into a suitable container.

10. Change the filter element. See the Topic “Transmission System Oil Filter-Replace” in this manual.

11. Close the drain valve in the torque converter. Close the drain valve in the transmission case.

12. Remove the hoses and remove the pipes from the drains.

13. Remove the swivel or remove the pipe from the drain in the bevel gear case. The drain valve will close.

14. Clean the oil drain plugs and install the oil drain plugs.

Clean Screens

Screens should be removed and cleaned when the oil is drained. Drain the oil into a suitable container before removing any screen.

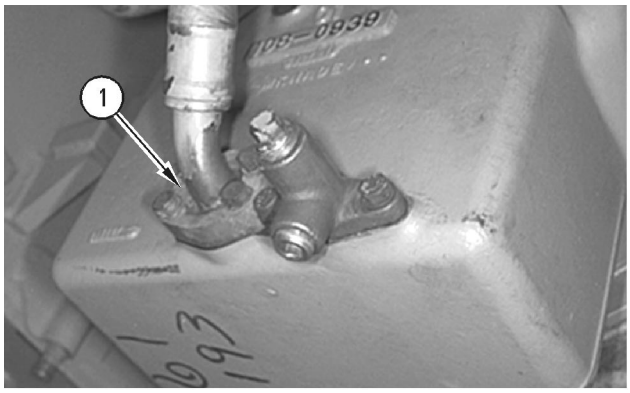


Illustration 338 g00484863

1. Remove torque converter scavenge line (1). Remove the screen.

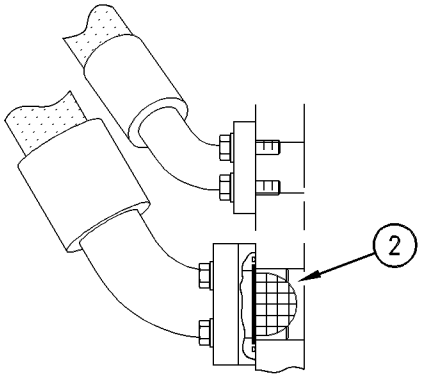


Illustration 339 g00484867

2. Remove the suction line for the power train oil pump. Remove screen (2) from the front wall of the bevel gear case.

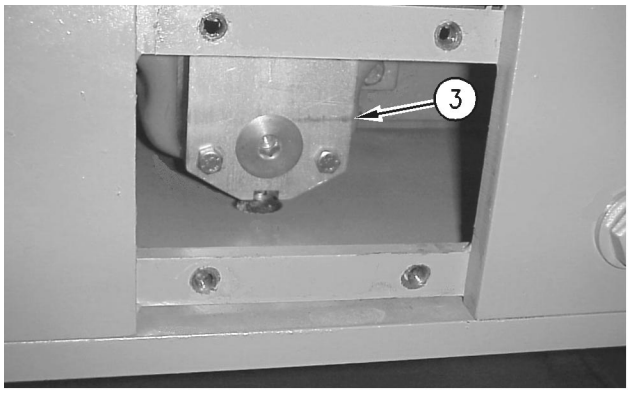


Illustration 340 g00680664

3. Remove cover (3) from the transmission scavenge screen. Remove the screen.

4. Clean the three screens in clean, nonflammable solvent.

5. Install the screens. Install the covers.

Fill With Oil

1. Open the access door for the filler cap. The filler cap is located on the right side of the machine next to the hydraulic oil tank.

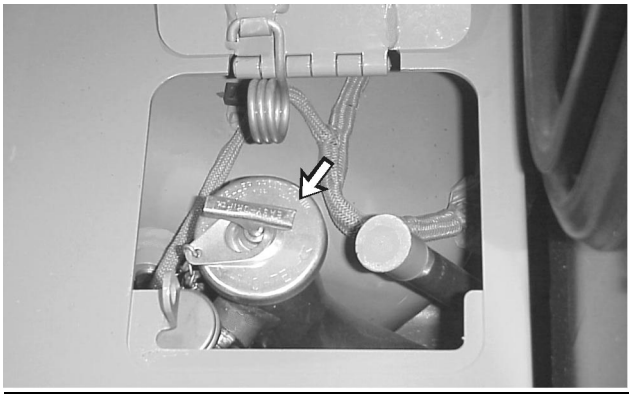


Illustration 341 g00680518

2. Remove the oil fill cap.

3. Fill the bevel gear case with oil. See Topic “Refill Capacities” in this manual.

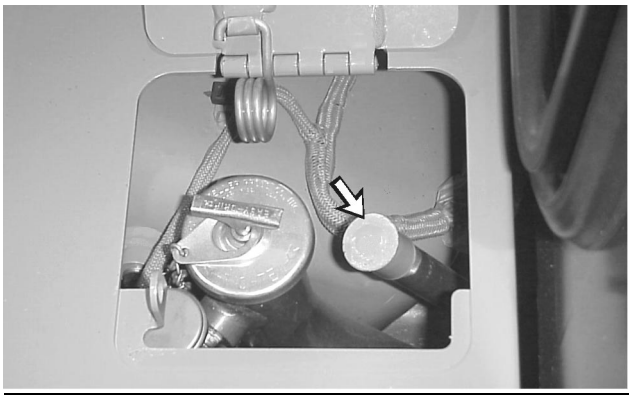


Illustration 342 g00680519

4. Always measure the oil with the dipstick.

5. Maintain the oil level within the OPERATION ZONE marks on the dipstick. The engine should be running at low idle. The power train should be at operating temperature. See the Topic “Transmission System Oil Level - Check” in this manual.

6. Clean the oil filler cap. Install the oil filler cap.

7. Install the rear bottom guard.

For additional information about transmission system oil, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01245474

Walk-Around Inspection

SMCS Code: 7000-040

⚠ WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. Clean up fuel spills immediately.

NOTICE

Accumulated grease and oil on a machine is a fire hazard.

Remove debris with steam cleaning or high pressure water, at the specified interval in the Maintenance Interval Schedule or each time any significant quantity of oil is spilled on the machine.

A thorough, regular visual inspection of the machine is necessary to maintain machine performance, availability, and safety. Make this inspection when the maintenance that is scheduled for every 10 service hours or daily is performed.

Methodically inspect all exposed, easily accessible areas of the machine for loose fasteners, missing parts, damaged parts, cracked parts, broken parts, worn parts, debris buildup, oil leaks, coolant leaks, and fuel leaks.

Note: **Initiate corrective action for fluid leaks, damaged parts, excessively worn parts, loose fasteners, and missing parts. Also check for accumulated trash, dirt, grease, or oil.**

During this general machine inspection, give special focus to the following items.

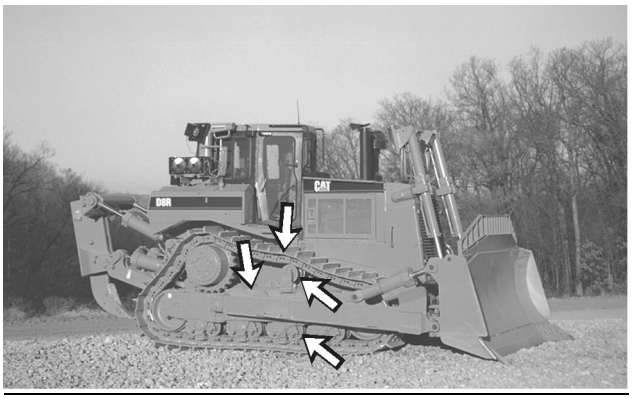


Illustration 343 g00664519

- Inspect the tracks, track roller frames, idlers, and rollers for oil leaks, and excessive wear. Visually evaluate the tightness of the track. See the Topic “Tracks Check/Adjust” in this manual.

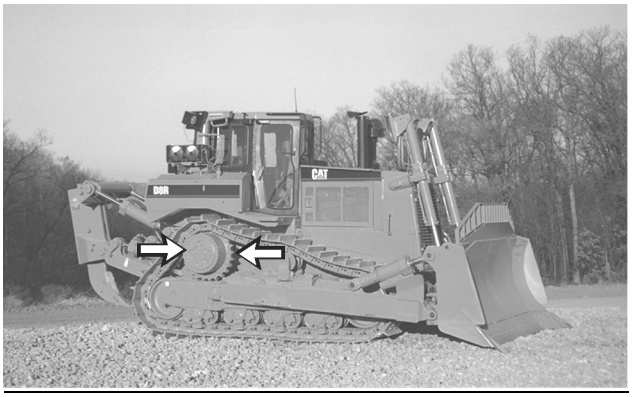


Illustration 344 g00664527

- Inspect the final drives for debris that may be wrapped around the drive. Check duo-cone seals for oil leaks, and sprocket segments for wear.

Illustration 345 g00664532

- Inspect the GET (ground engaging tool(s)) (bulldozer and ripper) and other wear surfaces for excessive wear and damage.

- Inspect the linkage for the bulldozer and inspect the linkage for the ripper. Also, inspect the fasteners for the linkage.
- Inspect exposed guards, shields, and covers.
- Inspect the winch for oil leaks.

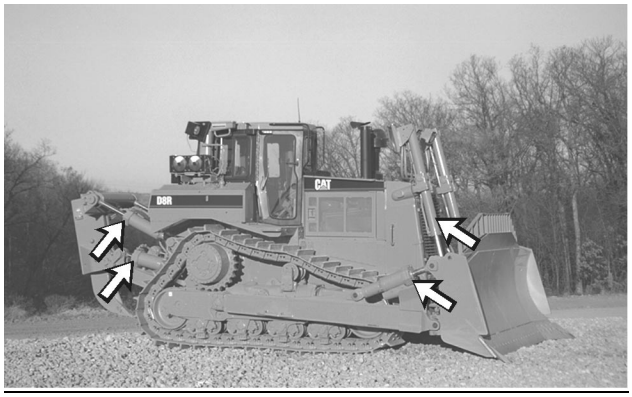


Illustration 346 g00664549

- Inspect the implement hydraulic cylinders for damaged rods or bent rods and for leaks.
- Inspect exposed hoses and hose couplings for damage, wear, and leaks.

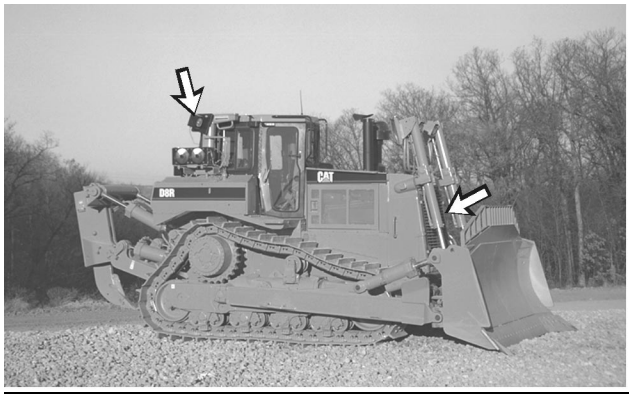


Illustration 347 g00664552

- Inspect the radiator for debris buildup, coolant leaks, and damaged fins and tubes.
- Inspect the Flexxaire Fan (if equipped) for damage to the blades or for oil leaks.
- Inspect the lights for broken bulbs and for broken lenses. Inspect light guards and shields for damage.
- Inspect exposed wiring and connectors for damage and wear.

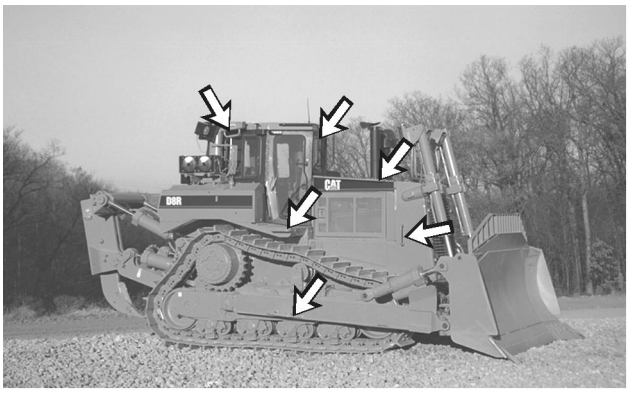


Illustration 348 g00664556

- Inspect steps and handholds for damage and cleanliness.

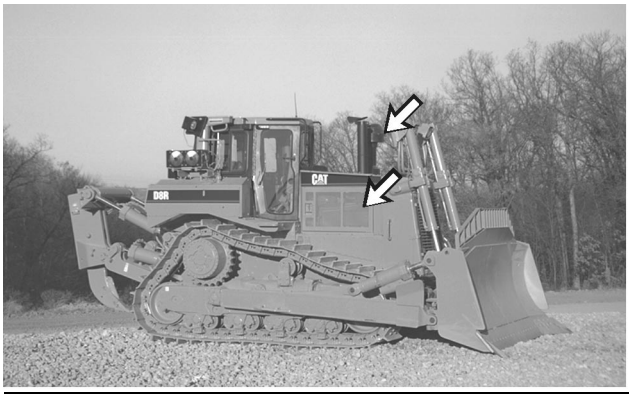


Illustration 349 g00664559

- Inspect the precleaner screen for debris buildup.
- Inspect the engine compartment for fluid leaks, buildup of debris or trash, loose fasteners, worn hoses, and damaged wiring.
- Inspect the crankcase guard for debris buildup.

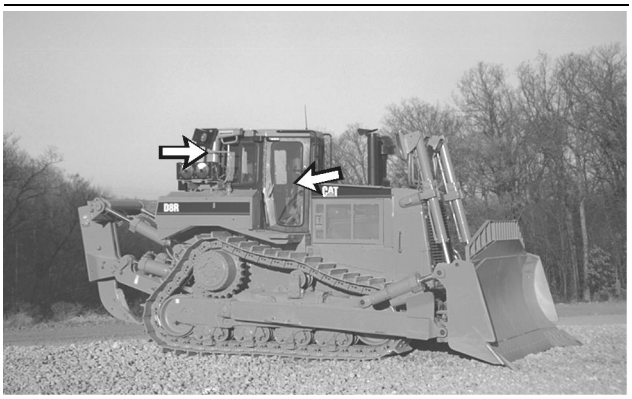


Illustration 350 g00664564

- Inspect the rollover Protective Structure (ROPS) for damage. Inspect the Falling Object Protective Structure (FOPS) for damage. Consult your Caterpillar dealer for necessary repairs.
- Inspect the operator compartment for cleanliness.

i01507412

Winch Fairlead Rollers - Lubricate (If Equipped)

SMCS Code: 5163-086

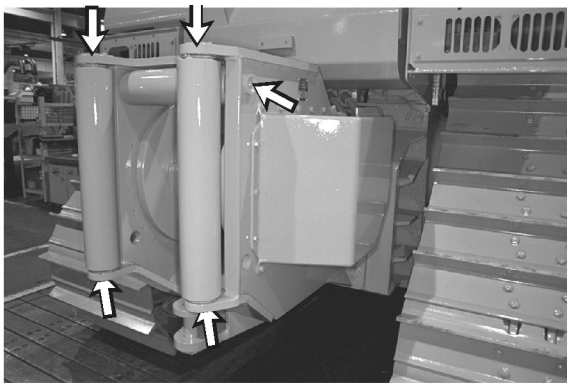


Illustration 351 g00544382

Lubricate the five fittings. Use MPGM Grease.

i01252116

Winch Oil Level - Check (If Equipped)

SMCS Code: 5163-535-FLV

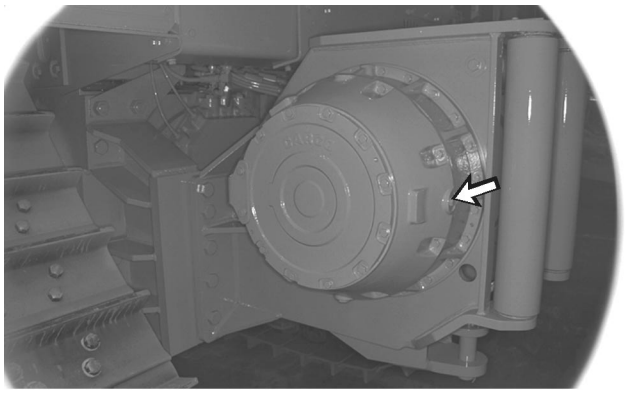


Illustration 352 g00530827

Remove the plug in order to check the oil level. The oil level should be maintained to the bottom of the level plug hole.

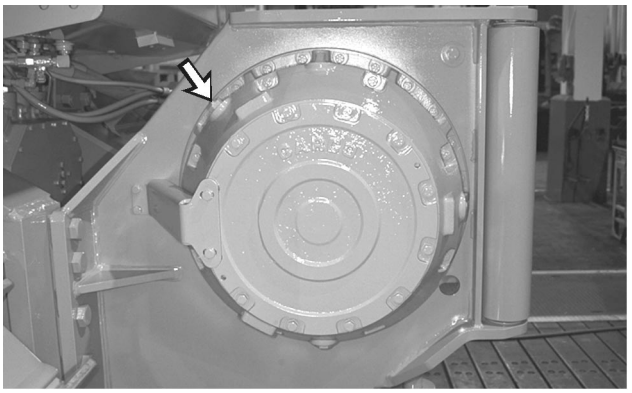


Illustration 353 g00544425

If necessary, remove the oil filler plug and add oil.

Check for oil leaks around the covers and around the hoses. Repair any oil leaks.

i01522077

Winch Oil and Breather - Change/Clean (If Equipped)

SMCS Code: 5163-044

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

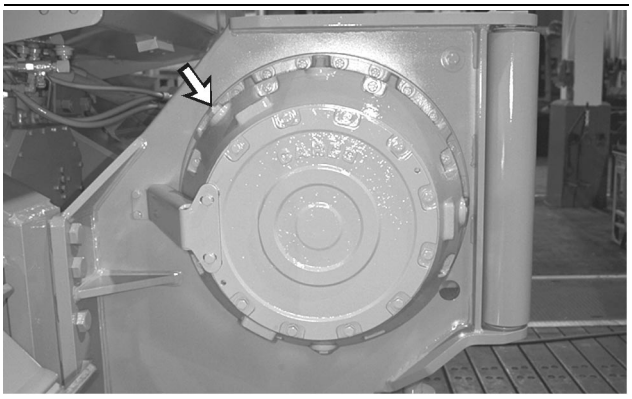


Illustration 354 g00544425

1. Remove the oil filler plug.

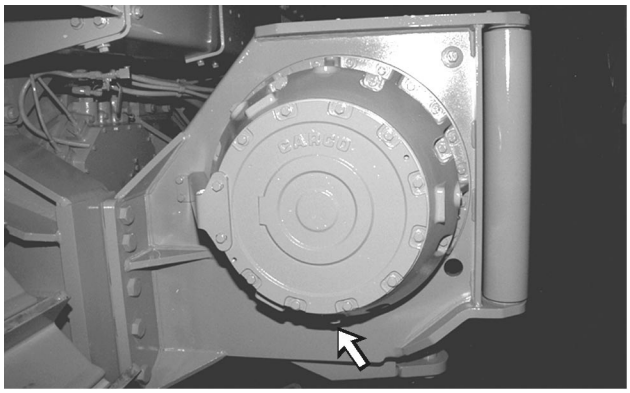


Illustration 355 g00550902

2. Remove the drain plug on the bottom of the winch. Allow the oil to drain into a suitable container.

3. Inspect the plug seal. If necessary, replace the plug seal.

4. Clean the drain plug and install the drain plug.

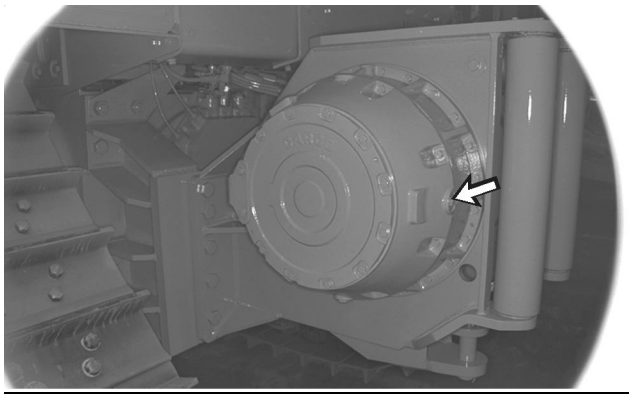


Illustration 356 g00530827

5. Remove the oil level plug.

6. Fill the oil compartment until oil is visible at the bottom of the opening for the oil level plug. See Operation and Maintenance Manual, “Refill Capacities”.

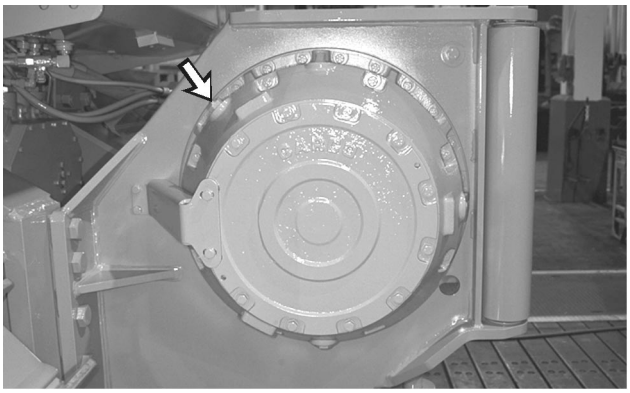


Illustration 357 g00544425

7. Clean the vent plug that is in the filler plug. Use a clean nonflammable solvent.

8. Clean the filler plug and install the filler plug.

9. Run the engine at low idle. Maintain the oil level so that the oil level is visible at the bottom of the opening for the oil level plug.

10. Install the oil check plug.

For additional information about winch oil, see Operation and Maintenance Manual, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i01252133

Winch Wire Rope - Install (If Equipped)

SMCS Code: 5163-012

The cable is attached to the drum on the winch with a cable ferrule. The ferrule is placed into a socket on the drum.

Use the following table to order the cable.

Table 21

Wire Cable		
Wire Rope Diameter	Recommended Ferrule	Holding Capacity
25 mm (1 inch)	L-8	91 m (300 ft)
29 mm (1.13 inch)	J-9	84 m (276 ft)
32 mm (1.25 inch)	J-10	59 m (193 ft)

1. Put the cable in a straight line behind the tractor.

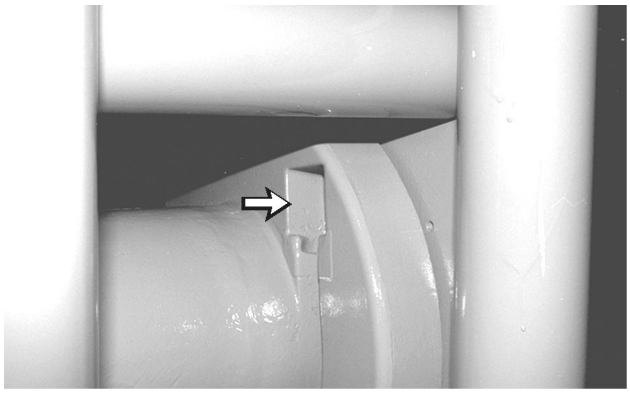


Illustration 358 g00550538

1. Install the ferrule end into the socket .

2. Reel in the cable.

i01253800

Window Washer Reservoir - Fill (If Equipped)

SMCS Code: 7306-544

NOTICE
When operating in freezing temperatures, use Caterpillar or any commercially available nonfreezing window washer solvent.

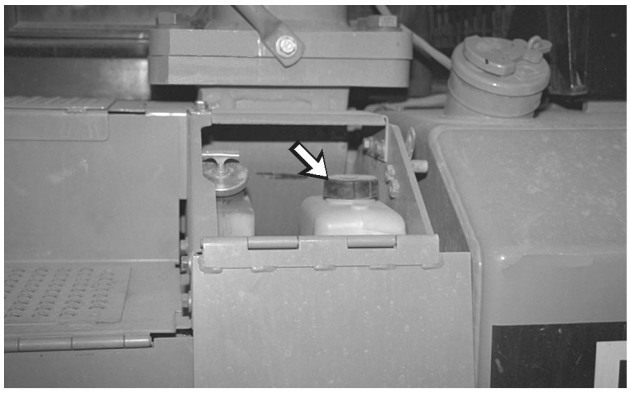


Illustration 359 g00668163

Windshield Washer – The washer fluid bottle is on the left side of the machine in a compartment between the battery box and the fuel tank. Open the access cover. Remove the fluid bottle cap in order to fill the washer fluid bottle.

i01253811

Window Wipers - Inspect/Replace (If Equipped)

SMCS Code: 7305-040; 7305-510

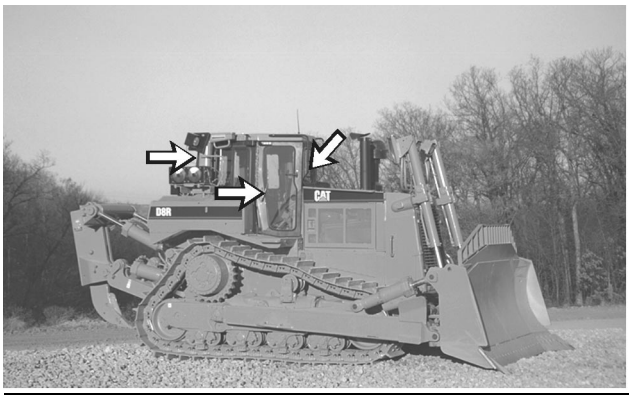


Illustration 360 g00668182

Inspect the front windshield wiper blade, the right windshield wiper blade, the left windshield wiper blade, and the rear windshield wiper blade. Replace any wiper blades that are damaged or worn. Replace any wiper blades that streak the windshield.

i01083628

Windows - Clean

SMCS Code: 7310-070; 7340-070

If equipped:

Use commercially available window cleaning solutions to clean the windows.

To clean the outside of the rear window from the inside of the cab, remove the sliding section of the rear window. Use the following procedure in order to remove the sliding section of the rear window.

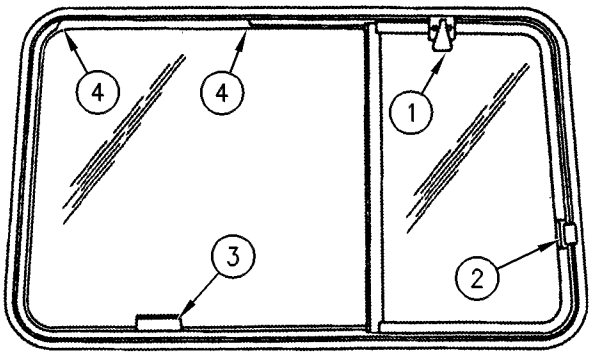


Illustration 361 g00039956

1. Lift latch (1) in order to slide the small window. Squeeze latch (2) in order to move the window from the CLOSED position.

2. Move handle stop (3) to the UP position. To move the handle stop to the UP position, lift the handle and rotate the handle simultaneously. Rotate the handle until the handle is vertical.

3. Move the small section of the window to opening (4) in the upper window channel.

4. Tilt the top of the window toward the inside of the cab. Remove the window.

5. Stay inside the cab in order to clean the outside of the rear window.

6. After cleaning, install the sliding section of the rear window.